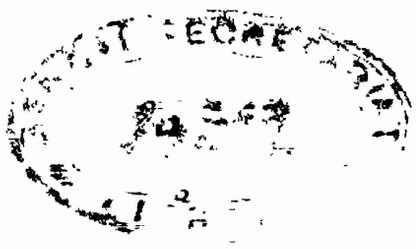

CROP EXPERIMENTS,

BOMBAY PRESIDENCY,

1893-94.

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SECRETARIAT

No. $\frac{A}{3671}$ OF 1894.

FROM

E. C. OZANNE, ESQUIRE, I.C.S., M.R.A.C.,
Survey Commissioner, and Director, Land
Records and Agriculture, Bombay;

To

THE HONOURABLE JOHN NUGENT, ESQUIRE, I.C.S.,
Chief Secretary to Government,
Revenue Department, Bombay.

Poona, 1st December 1894.

SIR,

I have the honour to submit the Annual Report on Crop Experiments for 1893-94, which has been again admirably drawn up by Mr. J. W. Mollison, M.R.A.C., Superintendent of Farms. The report is annually increasing in bulk, and its submission before the opening of the fair season becoming more and more difficult. As, however, previous Analyses deal so fully with points of doubt there is not the necessity that once existed of immediately placing the compilation into the hands of Revenue officers for guidance. I felt inclined to expedite publication and diminish bulk by confining the report to an exhibition of the tabular summaries, with some enlargement of the details shown in the column of remarks in the summaries; but a perusal of Mr. Mollison's comments will, I think, show that such a course would greatly detract from the value of the compilation. Its value is very considerable. Not only does it annually give a large amount of information as to agricultural practices, and thus stimulate agricultural enquiry, but it contains free criticism of the burden of the revenue demand, not only by the experimenters, but by a trained agricultural expert. I think then that the only wise method of curtailment is to omit all reference to experiments which fail to reach a fairly satisfactory standard, the explanation for rejection being given in a separate report to the Commissioners. This method of curtailment I propose to adopt in future.

2. The work done is shown in the usual table, thus :—

Division.	Experiments, 1892-93.		Experiments, 1893-94.	
	Reported.	Rejected.	Reported.	Rejected.
Northern Division	54	...	44	1
Central Division	34	5	45	20
Southern Division	32	2	45	2
Total ...	120	7	134	23

The increased importance with which Government views this work, as a means of preparation for the next quinquennial return of yield statistics required by the Secretary of State, induced an increase of 80 per cent. in the number of experiments last year on the average of the preceding six years, which increase has now risen to 100 per cent. Preference has been given to ordinary experiments over the "special" experiments of the kind first prescribed in 1881, chiefly because the former are less difficult and afford equally good information as to yield, which is the point at present under special study.

3. • Of recent years a programme for each district has been suggested by the Director, in order to secure tests on those crops of which the yield figures are least known or most important. The crops subjected to test this year are shown in the following table. Those for which information is required in the quinquennial return are marked with an asterisk :—

Division.	Jowári.*	Bájri.*	Rice.*	Wheat.*	Barley.*	Kodra.	Ragi.*	Vari.	Tur.	Gram.*	Potatoes.	Onions.	Sugarcane.*	Sesamum.*	Linseed*	Niger seed.	Ground-nut.	Total.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Northern Division ...	...	7	8	4	2	...	5	...	...	9	1	...	4	4	...	...	...	44
Central Division ...	9	7	1	7	...	...	1	...	...	8	...	1	4	...	3	...	4	45
Southern Division ...	9	8	9	...	...	3	9	2	1	2	..	...	...	...	1	1	...	45
Total ...	18	22	18	11	2	3	15	2	1	19	1	1	8	4	4	1	4	134

Northern Division.

4. The number of experiments as compared with last year shows a slight decline. The Superintendent of Farms took one test in Surat. No help was received from Survey officers ; the one report which was submitted by Mr. Forbes being excluded for reasons recorded. Messrs. Doderet (Surat), Phirozsháh (Broach) and Patvardhan (Thána), have submitted valuable reports. Mr. Pránlál (Panch Maháls) has not succeeded so well as last year. On the whole the standard of quality in the Northern Division is very fair.

5. In this Division, revision settlements are in progress, and in Surat and Broach it has yet to be decided whether the current rates shall be re-guaranteed without modification or whether they require re-distribution, even though a net reduction in some tálukas be the final result. The experiments of the year are important and give evidence that the distribution of the revenue demand in Broach and Surat is not equal and its pitch high in comparison with the standard in the revised portions of the province. Mr. Mollison, however, shows that Mr. Doderet has not fully made out a case of inequality of rating in Nos. 30 to 32. I have thought it necessary to make special enquiry on the Broach and Surat experiments and append the results to this letter. In Broach, Surat and Thána, where the original survey rates have not been revised, Mr. Mollison's careful criticism will receive special attention from the Settlement officers. It is satisfactory to notice that in revised districts there is small evidence either of excessive or of unequal assessments. No one who studies the compilation with intelligence will be misled by occasional high percentages in column 11, where the incidence is calculated on second crops alone as Mr. Mollison shows that the cost of cultivation of such crops is very small and that a comparison should rather be made between the figures of columns 9 and 10. I explained last year that a high percentage incidence in valuable productive land leaves a higher actual profit than a much lower incidence in poor land. In the Northern Division the range of assessment is greater than anywhere else in the Presidency, a natural consequence of the corresponding range in productive value, as well as evidence of the adaptability of the survey valuation throughout.

6. Gujarát is also remarkable for striking contrasts in the skill of its cultivators, but it is satisfactory to notice that in Broach and Surat (Nos. 29 and 33) Koli cultivators are not always poor farmers. The great value of the concession made at revision under which direct well assessments are being eliminated in Gujarát, is well exemplified in experiments Nos. 9 and 10. The value of the allowances made by survey principles for outlying fields is also evidenced by Mr. Phirozsháh's experiment (No. 29). Outlying fields are seldom manured, both because the available supply is preferably utilized nearer home, and because the cost of carriage to distant fields and the loss of time are considerable.

7. Mr. Mollison's conclusion must be accepted that even where, as in Broach and Surat, assessments appear high, there is a liberal margin of profit to those who farm well. At the same time Mr. Mollison cannot refrain from saying that in Broach the proportion of liberally cultivated dry-crop land is small in comparison with that where the cultivation is negligent and where in consequence the incidence of assessment is felt.

8. The high rental obtained by sub-letting is evidenced in experiment No. 33.

9. In several cases evidence is forthcoming of the incorrectness of the standard formulæ prepared some years ago. These corrections are specially valuable in view of the obligation imposed by the Secretary of State to make all efforts possible to improve present knowledge in this respect.

Central Division.

10. The number of reported experiments shows a material increase, but this is due to the assistance of the Survey Department, the Divisional Inspector and the Superintendent of Farms. The experiments made by the two last named officers are of special value, as indeed they should be. Mr. Hampton, Assistant Superintendent of the Survey Department, is a measuring Assistant, with no special experience in this kind of work, but his energy in the matter is commendable. Most of his experiments have, however, been rejected for reasons recorded. In my opinion it would have been better if experiments Nos. 52, 53, 56 to 60 and 78 had also been excluded from the tabular summary. Mr. Chitgubi and Mr. Kázi Kamruddin in Khándesh and Mr. Thatte in Násik are still considerably below the standard which Revenue officers have generally reached. Mr. S. Padamji of Ahmadnagar shows much improvement and the work done by Messrs. Arthur and Cursetji in Sátára is very satisfactory in quality.

11. No suspicion of over-assessment is raised by any of the experiments, except perhaps that by No. 56, but, as has already been said, Mr. Thatte's work is not careful. There is ample evidence, on the other hand, that where capital has been laid out either in good cultivation (Nos. 70, 76 and 77) or in land improvement (No. 87), the incidence of assessment is an almost negligeable quantity.

12. Five experiments (Nos. 57, 58, 74, 75 and 89) were taken on land assessed as *pátasthal*. The incidence is very light.

Southern Division.

13. The improvement in the number of experiments is considerable, but their value is reduced by the selection in so many cases for test one only of the crops in a mixture. In drawing up the programme for experiments during the current year experimenters have been invited as far as possible to select crops grown alone on a set area or else to include in the test all the crops of a mixture. It will have to be seen how far this advice can be followed. For the reasons recorded in his comments on several experiments by Mr. Mollison, it is impossible to judge of the burden of the assessment except by dealing with crop mixtures thoroughly or by avoiding them in selecting crops for experiment. The difficulty will be most felt in Dhárwár, Bijápur and Belgaum.

14. Several officers have done valuable work in this Division. Messrs. Batchelor (Bijápur), Kánga (Dhárwár), DuBoulay (Kolába), Kamlápurkar (Ratnágiri), and Divátia (Kánara) may be mentioned. Mr. Pánse in Ratnágiri chose exceedingly poor data as a basis for his voluminous remarks. Only two experiments have been rejected, sufficient reasons having been recorded in both cases.

15. As regards the Karnátak districts the experiments go to show a low incidence in assessment both in the opinion of the experimenters and in that of their reviewer, as well as a reasonable gradation of the valuation according to the agricultural value of the land as shown by crop results when differences due to neglectful cultivation and the like are eliminated.

16. The experiments in Kolába are valuable as justifying the treatment at revision survey of *varkas* and *rabi* lands insufficiently appreciated at original survey. In experiments Nos. 114 to 116 the assessment still current was badly graduated and excessively low. The latter remark applies to No. 118. In all

these cases, even allowing for fallow, the rent charge is less than one-hundredth part of the value of outturn on the area cropped, even in the case of the second crop after the fallow. Experiment No. 120 shows that *rabi* land was better appreciated in southern than in northern Kolába at the original survey.

17. With respect to the Collector's remark below experiment No. 118, I need only say that I have demonstrated that grass and household refuse of sorts cannot alone make a good rábed seed-bed. On the other hand cowdung is, as the Collector supposes, more valuable than tree-loppings, but its supply is nowhere sufficient for ráb.

18. The information obtainable from the experiments in Ratnágiri as regards burden of assessment is somewhat scant, but I think that even with the clearly proved inadequacy of the ráb supply the assessment is nowhere shown to be unreasonable.

19. In his remarks on Mr. Pánse's experiments, Mr. Mollison has fallen into an apparent error. The minute division of land into *pot* numbers was not the cause, but the result of minute sub-division of holdings.

20. The experiments made do not prove over-assessment in Kárwár, but if local officers have formed that opinion it rests with them to produce evidence more conclusive than that now afforded by the papers. The revision of the Kánara settlements cannot result in any taxation of the improvements made by private capital. The tagái reports for the last year give satisfactory evidence that great improvement is going on in Kánara with the liberal encouragement afforded by Government, with full confidence on the part of those interested that they will enjoy the full results of their enterprise.

I have the honour to be,

Sir,

Your most obedient Servant,

E. C. OZANNE,

Survey Commissioner, and Director,
Land Records and Agriculture.

P. S.—This review has been delayed in order that fuller information than that afforded in the crop report might, if possible, be obtained where the incidence of assessment on gross produce exhibits a high rent charge, which in cases is so high as apparently to leave not only no margin of profit but an actual loss to the cultivator, even if the cost of cultivation be taken at a very small figure.

BROACH.

In Broach all the experiments made by Mr. Leggatt (Nos. 24 to 26) are conspicuous instances of extraordinary results, while those made by Mr. Phiroz-sháh (Nos. 27 to 29) demand some comment.

The Broach district is still under original settlement. I have already noticed Mr. Mollison's opinion, expressed in his analysis, that in Broach the incidence of assessment on all dry crops, save cotton grown on really first class black land, is seldom less than 20 per cent. of the gross yield; and that in the highly assessed rice (*kiári*) land, nothing but careful and laborious cultivation will pay. But there is an element in assessment which has not been adequately noticed either by Mr. Mollison or by the experimenters themselves, which has special reference to the cases under comment, *viz.* the heavy direct charge on both dry-crop and rice land where well irrigation is available and actually utilized. The orders of Government as to all Gujarát are that such direct well assessments shall at revision be taken off absolutely. The facility for, and not the use of, well irrigation is taxed under the subsoil water rules to prevent a too heavy charge on those cultivators who have spent money on wells, who are not, according to present policy, liable to be charged a higher assessment than those who have the same facilities, but who have not used them.

The total loss of the Survey Records in Gujarát by the fire of 1887 makes it impossible to state the exact elements in the assessment of each field. More information than now at hand may be obtained from the village papers, but I cannot delay this report to examine those records.

Experiment No. 24.—If, as stated, the field is cotton soil and not rice-land, the assessment even on 16-anna soil cannot be above the maximum rate for dry-crop, which in this village is Rs. 6-8-0, but Mr. Leggatt shows an incidence of Rs. 19-8-0. It can only be conjectured that the field is assessed heavily for a well in the field itself, or in an adjoining field, over which the occupant has a right. The charge per *kos* (water-lift) on wells in Broach at the original survey was as high as Rs. 33-8-0, a charge which was distributed over the area with right to the water. Mr. Leggatt gives no hint that such a well exists, nor does the rotation shown indicate its existence; still, without a heavy charge on a well, the assessment reported could not have been levied.

Experiment No. 25.—The village is largely a *bhátha* village, *i. e.* made up of alluvial deposits from the Narbada, which are of extraordinary value, though liable to occasional damage of a serious nature if the floods are unseasonable. The highest possible assessment for *bhátha* land in this village is Rs. 17-8-0, while the assessment is shown by Mr. Leggatt to be Rs. 11-3-1 per acre. But he says it is black soil, and black soil is not *bhátha*. I made some remarks on *bhátha* in my last year's review, to which I again invite attention. If the field is not *bhátha*, it may be black soil with a direct well assessment, but no indication in the report supports this conjecture.

Experiment No. 26.—Black cotton soil without irrigational facility, as this is reported to be, could not bear an assessment above the maximum rate (Rs. 5-8-0) for the village.

Further enquiry then is necessary in each one of the cases which are the subjects of these experiments.

Experiment No. 27—Chorási.—The highest assessment on rice land in this village (maximum rates—soil Rs. 6-8-0, and water Rs. 5-8-0) when the water in a tank or fresh water stream is not sufficient for a second crop after the rice, would be Rs. 12-0-0. With perennial water the assessment might have been as high as Rs. 17-8-0; but in this case, though apparently some charge was made for the clearly indicated facility for growing a second crop with the moisture left after the rice is reaped, the charge for second crop could hardly have exceeded Re. 1-6-0. Though the acre incidence is high there is a good and sufficient margin of profit. Last year I showed that in highly assessed land a high incidence is fully justifiable, and really a smaller rent charge than a lower incidence on poor and lightly assessed land.

Experiment No. 28.—This is a case of dry-crop assessed for a well under the old *bágáyat kasar* system. As such, the assessment is not high, but in the year under report only a dry crop was taken in the rotation.

Experiment No. 29.—Ordinary dry-crop with a fair assessment, as shown by the results. The cost of cultivation of dry-crop wheat is very small.

Surat.

Experiments Nos. 30 to 32 were taken in Bulsár, where the old survey rates still in force, are for soil Rs. 4-8-0 and water Rs. 12-0-0 in rice land. In none of the three cases is the incidence excessive. In No. 32 there is tank assistance, where the assessment for rice land might be as high as Rs. 22-8-0. As the assessment is higher than this figure, it may be presumed that this field has an increment for close proximity to the village site, and that it has been classed also at almost the maximum asssessment. No doubt also it takes a high charge for second crop as the experimenter states that a crop after rice is grown annually.

Experiment No. 33.—Maximum rates—soil Rs. 5-0-0 and water Rs. 9-8-0. The field has also well assistance or direct charge for well irrigation. The assessment cannot be fully explained without further enquiry.

Experiments Nos. 34 to 36 are in Olpád, a táluka under revision operations, though a revision of the settlement has not yet been finally sanctioned, pending consideration of a detailed report as to whether the Surat district shall be revised or whether current rates shall be extended for a further lease. There is nothing in these reports to show that the assessments are excessive.

9th December 1894. E. C. O.

ANALYSIS OF CROP EXPERIMENTS.

NORTHERN DIVISION.

Ahmadabad.

The programme settled for this district was only partially followed. Mr. Curtis was asked to take tests on wheat, *juvár* and gram. He reported two tests on barley and one on gram. Mr. Kábráji should have conducted tests on wheat, cotton and *juvár*. He dealt with the first only. The District Deputy Collector was directed to experiment on *bájri*, sugarcane and gram. He submitted two tests on each of the last two.

Mr. G. S. Curtis, Assistant Collector,

Reports two tests on barley and a third on gram. The barley fields (Exp. Nos. 1 and 2) are each classed as garden land, are each irrigable from a well and are assessed respectively at Rs. 5-2-0 and Rs. 3-13-0 per acre. Barley was a second crop in each field, following rice in the first field and *juvár* in the second. The sequence of crops taken during the last three or four years indicates that an exhaustive rotation is practised. The first field grows rice every year as a rain crop and commonly barley as a cold weather irrigated crop. The second field grows *juvár*, rice and *bájri* in consecutive years, as rain crops and generally barley as a second crop. The first field was manured for the rice crop with castor cake, approximately 6 cwts. per acre being given. The second field was directly manured for the barley, 9 cart-loads of ordinary manure per acre being applied. The occupant of each field is a Pátidár and the cultivation is described as good; but rust (*geru*) damaged each crop a good deal. It is certain that the reported seed rate, 246 lbs. per acre, of the first field is much too high; that of the second field, 143 lbs. per acre, is nearer correct. The seed was drilled in each case early in November. The first crop was ripe on the 5th of March; the second on the 17th. The extent of irrigation is not reported, but the heavy rainfall left plenty of water in the wells. The outturn, &c., results are tabulated below:—

	Anna Estimate.	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 1) ...	10 to 11	795	205	16 12 0	5 2 0	30·59
Second do. (Exp. No. 2) ...	11	1,124	410	24 6 7	3 13 0	15·61

The proportionate weight of straw to grain is very small in each case. So much so that I doubt the accuracy of the by-product figures. The percentage incidence of the first test appears high. It would be considerably lessened if count be taken of the value of the rain crop, and if the crop under test had not been seriously damaged by blight.

Gram, the subject of this officer's third test (No. 3) yielded well. The occupant of the field is a Koli, and his cultivation, like that generally of his caste, was indifferent. No manure was given. Gram was the sole crop this year as well as last. In the two previous years the field grew *bájri* with cotton, and *bájri* with castor seed. The field has *gorádu* soil, and bears an assessment of Rs. 3-0-11 per acre. No doubt rain crops could be grown every year. The heavy rainfall of the year presumably gave the soil sufficient moisture for the gram. The

reported seed rate, 184 lbs. per acre, is much too high. The outturn is estimated at 16 annas and a yield of 1,241 lbs. pulse per acre is valued at Rs. 28-5-9. The by-product is reported to have no market value, although the husk and chaff are fed to cattle. The incidence works out 10·78 per cent, which, considering that the land is capable of growing grain crops, is, I think, fair.

Mr. J. K. N. Kábráji, Assistant Collector,

Reports three wheat tests. The first two (Nos. 4 and 5) may advantageously be compared. The fields adjoin. Both are more or less impregnated with salt. The field that lies lowest is visibly impregnated most. This field bears a higher assessment than the other. The respective rates are Re. 0-14-4 and Re. 1-6-4 per acre. The soil in each case is black. No manure was applied to either field. The season was suitable and the tillage is reported as good. The higher assessed field, the field with the most salt, produced the worst crop. Each crop is valued at the average standard. It is not clear why the crops should bear the same anna valuation. The experimenter does not pointedly say that he questions the comparative fairness of the assessments levied on each field. But the inference is that he does, and that the tests were undertaken partly for the purpose of showing that the burden of assessment on the one field is not so fair as that on the other.

Ordinarily each field grows *vari* every year. This year in each field *vari* was a comparative failure. In the previous year also *vari* failed in each field. It is not reported whether these failures are attributable to excess of salt in the land or to unfavourableness of season. It is reported, however, that the field with most salt always grows the worst crop of *vari*. Wheat was grown in those fields, because the heavy late rainfall seemed suitable for the crop. To a certain extent the cultivation was experimental, as only once had this cereal been tried previously, and only in one field, and then it proved a failure. The field with least salt had a dressing of manure in the previous year, when the crop to which it was applied failed. The field with most salt has not recently been manured. Each crop was drilled. The seed was sown in each field about the same time, and the test areas were harvested on the same day. The seed rates differ somewhat, that of the salt field being the highest. The cultivation of each crop in other respects was the same. At least there is nothing to the contrary reported. The by-products were neither weighed nor valued. The outturn, &c., results are as under :—

	Anna Estimate.	Outturn of grain per Acre.	Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
	As.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (slightly salt) (Exp. No. 4).	16	631	16 5 3	0 14 4	5·48
Second do. (more salt) (Exp. No. 5).	16	328	8 7 10	1 6 4	16·44

The above figures indicate that the burden of assessment is heavier in the second field than in the first, but it would be unwise to conclude that such is the case without fuller information in particular as to the skill and caste of the respective occupants.

The third wheat test (No. 6) was taken on black cotton land. The field grows wheat and cotton in rotation, wheat being taken when the rainfall is too heavy for cotton. This year cotton had actually been sown, but a late heavy rainfall damaged it to such an extent that it was ploughed up. Wheat of course benefited by the tillage for the cotton, also by the abundant late rainfall. There was almost too much moisture for the crop. It was slightly damaged by rats. The crop was sown seasonably. Forty-nine lbs. per acre is the reported seed rate. No manure was applied this year. The land bears an assessment of Re. 1-3-2 per acre. The crop ripened early in March and yielded 682 lbs. of grain per acre, worth Rs. 17-10-8. This is locally estimated as a 14-anna outturn. The

by-product was neither weighed nor valued. The incidence works out 6·78 per cent. and the burden of assessment is apparently fair.

Mr. Motilál Chunilál, District Deputy Collector,

Reports two gram and two sugarcane tests. The former I will first contrast. The crops selected (Exp. Nos. 7 and 8) in each case were the best in the village. This is against standing orders, unless the experimenter had a special object in view, which does not appear to have been the case. The first field is *kiári, i.e.,* embanked land. It bears an assessment of Rs. 3-7-8. In 1892-93 wheat and cotton were grown. This year gram followed a rain crop of *vari.* The field was manured for the rain crop with 12 loads per acre cattle manure. Tillage and season were both good. The gram was sown in November through a single tube affixed behind a plough. The seed rate, 47½ lbs. per acre, is about normal. The crop ripened early in February.

The second field is classed as *jirávat* or dry-crop land. It is assessed at Rs. 2 per acre. It lay fallow for 4 years prior to 1892, but for what reason is not reported. In 1892-93, gram only was grown. This year *til* was sown as a rain crop. It was washed away by flood water. Gram was sown, as in the first field, behind the plough; but the reported seed rate, 10¼ lbs. per acre, is, I am sure, an under-estimate. No manure was applied. Tillage and season were each good. The outturn is remarkable and indicates the fertilizing power of fallowing. On the other hand, the anna valuation by local cultivators is so low that I almost doubt the correctness of the experimenter's outturn figures. No value is put on the by-product in either test. The outturn, &c., results are as under :—

	Anna Estimate.	Outturn of pulse per Acre.	Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
	As.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 7) ...	8	615	11 4 0	3 7 8	30·92
Second do. (Exp. No. 8) ...	10	1,790	32 11 9	2 0 0	6·11

The first field is probably capable of growing double crops each year; and if the value of the rain crop be added the incidence would be considerably reduced. Even on the second crop a margin of profit would be left to the occupant, as the cost of cultivating gram is light.

This officer's sugarcane tests (Nos. 9 and 10) are not in all respects satisfactory. I think the principal product (*gul*) and the by-product (green tops) are valued at an inordinately high rate. On reference the experimenter says that the reported rates for *gul* are correct. The *gul* of each crop is valued at 9 1/10 lbs. per rupee. This would be a very high retail rate, and the difference between wholesale and retail prices is always considerable. The prices quoted in tests on sugarcane in previous years vary from 14 lbs. per rupee, when *gul* was dear, to 22 lbs. per rupee when it was cheap. This year the price quoted by an officer who experimented on sugarcane in the Surat district is 22½ lbs. per rupee. In the Poona district the best *gul* this year was saleable at 17 to 18 lbs. per rupee.

The fodder value put upon the green tops is also very high. This by-product is valued per acre at Rs. 52-8-0 in the first test and at Rs. 41-11-6 in the second. I think it is certain that the reported value of gross outturn of each field would be reduced by nearly half if valued at ordinary wholesale rates.

The first field is classed as ordinary dry-crop land, but at least a portion of it is irrigable from a one *mot* well. The field grew cotton in 1891-92. A rain crop was not taken in 1892, but the land was apparently got ready for sugarcane, which was planted in April 1893. A white variety was grown. The field bears an assessment of Rs. 3-6-0 per acre. It was liberally manured by folding sheep in December 1892 and January 1893. During February, camels were tied in the field, presumably like the sheep, only at night. In the month of March cattle manure, 40 cart-loads per acre, was applied. Castor cake, about 2,700 lbs. per acre, was applied after the cane had made some progress, as a preventive

against damage by white ants. It would also, of course, act as a valuable manure. The cost per acre for manure is as under :—

	Rs.	a.	p.
Sheep folding	25	0	0
Camel do.	10	0	0
Cattle manure	40	0	0
Castor cake	33	8	0
Total ...	108	8	0

The experimenter estimates the cost of cultivation, but I cannot accept the figures. Many items are very wide of the mark. The cost of irrigation is for 18 months, whilst the crop only occupied the field about 10 months. Probably the land was occasionally watered before planting to admit of ploughing. Sets are said to have cost Rs. 90 per acre, that being the estimated value of 1,125 canes. These canes are reported to have been cut each into 3 sets. If the canes were very large, they might have provided sets sufficient for an acre, but the sets for an acre need not necessarily cost more than Rs. 40 to Rs. 50. Season and tillage are described as good. Details of cultivation are not reported.

The second field is also classed as *jiráyat*; but the portion under sugarcane is *bágáyat* in this sense that it is commanded by a double-*mot* well and that irrigated crops of chillies, brinjals, wheat and sugarcane are grown. The assessment is Rs. 2-8-7 per acre. Black or dark coloured sugarcane was grown. This variety is hard. It yields less sugar than the white. But on the other hand, it is less liable to disease and to damage by jackals, rats, &c. The crop is reported fair. Like the white cane it was the best crop of the village; but it is only estimated at 4 annas. For this crop 1,330 canes, each cut into 3 pieces were used as sets. The cost of sets is estimated at Rs. 79 per acre. This is high. The field was manured with 60 cart-loads per acre of cattle manure before plantation, and with approximately 1,880 lbs. of castor cake per acre as a top-dressing when the crop had made some progress. The whole application of manure cost approximately Rs. 113 per acre. The crop was about 10 months growing. The comparative outturn, &c., results from each crop are given below :—

	Anna Estimate.	Outturn per Acre.		Value of Outturn.			Assessment per Acre.			Percentage incidence of Assessment.
		Gul.	Useful by-product.							
	As.	Lbs.	Lbs.	Rs.	a.	p.	Rs.	a.	p.	
First field (Exp. No. 9) ...	16	7,736	16,820	901	0	6	3	6	0	0·38
Second do. (Exp. No. 10) ...	4	4,738	13,350	561	11	6	2	8	7	0·45

The following results were obtained from the 8-guntha test area of each field :—

	White cane.	Dark cane.
Number of canes	7,332	8,748
	Lbs.	Lbs.
Weight of canes topped and stripped...	11,980	8,792
Weight of tops	3,364	2,670
Weight of juice	8,935	6,899
Weight of *gul*	1,547	948
Percentage, juice to cane	74·6	78·6
Do. *gul* to juice	17·3	13·7
Do. *gul* to cane	12·8	10·8

Kaira.

Only four experiments have been reported from this district. *Bájri* was the crop selected for this year's tests. Mr. Atkins could not carry out any tests on that crop owing partly to his absence on leave and partly to his finding no suitable crop on his return conveniently situated for experiment. Mr. Sorábsha conducted 3 tests on *bájri*.

Mr. J. DeC. Atkins, Assistant Collector,

Reports a gram experiment (No. 11). The field measured 27 gunthas and the whole area was tested. No doubt the correct acre outturn was thus obtained. A good crop of gram has no great bulk, and it is possible to test a large area of this crop with less expenditure of time and trouble than a smaller area of almost any other crop. There can be no objection in making the whole of the gram field the test area if the field is small. In another direction the experimenter struck out a line for himself which is wrong. He does not report the local anna estimate of the crop, because he distrusts anna estimates.

The field has black soil assessed at Rs. 3-11-3 per acre. Rice is taken every year, and a second crop when there is favourable late rain. This year November rain induced the cultivator to sow gram. The seed was drilled. The reported seed rate, 59 lbs. per acre, is high. The soil, however, may have been ploughed up rough, in which case a higher seed rate than usual would have been required. The field was liberally manured for the previous rice crop. The by-product is reported worthless for every purpose. This is not so. Four hundred pounds pulse per acre is valued at Rs. 9-1-2. The gram is valued very cheaply at 44 lbs. per rupee. It is probable that, though the incidence of assessment works out 40·81 per cent., there was a small margin of profit left to the cultivator, because the cost of cultivating gram after rice is always light. The cultivator, a Pátidár, appears to have been satisfied. He said the crop was as good as he expected.

Mr. Sorábsha Hormasji, District Deputy Collector,

Sends three *bájri* tests. Two of the fields (Exp. Nos. 12 and 13) grow pulses subordinate to the *bájri*. The subordinate crops were not tested, and, therefore, the results from the *bájri* alone form no guide as to the fairness of the burden of assessment. The experimenter tries to apportion the area under *bájri* in each of the mixed crop fields in ratio to the weight per acre of different seeds sown. Nothing could be more fallacious; for it is the character of the season and not the seed rate which will determine which crop or crops of a mixture will succeed best. On reference it has been reported that the subordinate pulse crops promised to yield well in each of the fields. It is probable that the mixed crop of the first field yielded better than the mixed crop of the second, because the former gave much the best *bájri* crop, yet without authentic figures as to the outturn of the pulse crops the reverse might actually be the case. Each field has *gorádu* soil. The first field is assessed at Rs. 3-5-4, the second at Rs. 4-10-8 per acre. The former was more liberally manured and better cultivated than the latter. The respective outturns are:—

	Anna Estimate.	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 12).	18	458	2,357	16 6 5	3 5 4	26·87
Second do. (Exp. No. 13).	8	185	1,363	7 3 3	4 10 8	64·79

Bájri grown alone was also tested. The seed rate, 19 lbs. per acre, is twice what it should be. This field also has *gorádu* soil and bears an assessment of Rs. 6-0-9 per acre, which appears high. Tobacco is occasionally taken but *bájri* is mostly grown. The field was fairly manured. Season and tillage are each described as

good. The crop is estimated at the average standard, and yielded per acre 621 lbs. grain and 2,454 lbs. of useful by-product. The gross acre outturn is valued at Rs. 20-12-6. The incidence of assessment, 29·09 per cent., is decidedly high.

Panch Mahals.

Mr. Maconochie, Assistant Collector, was asked to conduct two or three experiments on *bájri* followed by wheat. He tested *bájri* but could not do the wheat tests owing to his transfer. His successor arrived too late in the district to do any. Mr. Pránlál, who was directed to make three experiments on *rági* and two on sesamum, did 4 on the former and 3 on the latter.

The Assistant Superintendent, Gujarát Revenue Survey, working in this district, was also asked to take tests in *juvár*, rice and wheat. But owing to (1) pressure of work, (2) exigencies of tour, and (3) illness, he could not carry out any.

Mr. E. Maconochie, Assistant Collector.

This officer tested two *bájri* fields. This cereal is always a mixed crop in the Panch Maháls. The subordinate pulses were sown mixed with the *bájri* and occupied the same rows. The pulses were not tested and the *bájri* outturn is an indefinite proportion of the whole yield of each field. The reported seed rates are high. The crops were sown at the end of July, the first field being sown a second time at this date owing to the first sowing having been washed out by heavy rain. The fields have each poor *gorádu* soil. The first field is assessed at Re. 0-15-2 and the second at Re. 1-1-9 per acre. The former was lightly manured, while the latter was unmanured this year. The first field grows *bájri* and *bávto* in alternate years; the other grows *bájri*, *bávto*, *banti*, &c., but no definite rotation is practised. The cultivator of the first is not an agriculturist by caste; the occupant of the other is a minor; the cultivation of each suffered accordingly. The crops ripened at the end of October and gave the following results:—

	Anna Estimate.	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 15) ...	10	538	1,972	18 8 6	0 15 2	5·11
Second do. (Exp. No. 16) ...	10	277	1,228	10 2 10	1 1 9	10·90

The subordinate crops were fair, and it may be accepted that the burden of assessment is light. The effect of manuring the first field is well shown in the lower incidence.

Mr. Pránlál Harkisandás, District Deputy Collector,

Submits 4 tests on *bávto*, and 3 on sesamum. In the eastern Maháls the cultivation of *bávto* is apparently limited to small portions of holdings. The crops experimented upon occupied in each case small areas. The assessment of the first field, Re. 0-12-5 per acre, indicates that the field either by position or otherwise is inferior to the other fields, which respectively are assessed at Re. 1-12-9, Re. 1-2-11 and Re. 1-5-9 per acre. The first field grows only rain crops. The experimenter believes that the others are capable of producing second crops every year. The reported rotation, however, shows that only the field bearing the highest assessment has grown second crops during the last three years. This is a significant indication that the comparative values of the fields have been adequately gauged by the classer. All the fields have *gorádu* soil. The previous cropping of each field is tabulated below:—

	1890-91.	1891-92.	1892-93.	1893-94.
First field	Waste ...	Kodra ...	Niger seed ...	Bávto.
Second do.	1 Maize ... 2 Gram ...	1 Maize ... 2 Gram ...	1 Maize ... 2 Gram ...	Bávto.
Third do.	Udid (black gram.)	Mug (green gram).	Gram ...	Bávto.
Fourth do.	Sesamum ...	Udid (black gram).	Gram and Udid (each half the field).	Bávto.

The greater portions of the third and the fourth fields were under pulse crops again this year. This probably indicates a scant manure supply, because on land in poor condition pulses will undoubtedly yield better than cereals or oil-seeds. The second and third fields were lightly manured for the *bávto*. The others were not manured. The cultivation of the first field is described as bad, that of the other fields good. Each of the crops were grown from transplanted seedlings. The respective seed rates and area of seed-bed to acre of transplantation are as under :—

	Seed rate per Acre.	Seed-bed for an Acre.
	Lbs. tolas.	Gunthas.
First field	4 37	$1\frac{7}{33}$
Second do.	6 32	$1\frac{2}{3}$
Third do.	6 16	$1\frac{1}{16}$
Fourth do.	5 37	$1\frac{11}{24}$

The seedlings were planted out in the first or second week in August, and the crops were ripe in the second week of November. The outturn, &c., results are as under :—

	Anna Estimate.	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 17)...	8	451	1,715	7 6 7	0 12 5	10·47
Second do. (Exp. No. 18)...	14	1,050	2,823	16 15 0	1 12 9	10·60
Third do. (Exp. No. 19)...	17	1,272	2,954	20 1 4	1 2 11	5·88
Fourth do. (Exp. No. 20)...	12	919	2,539	15 1 0	1 5 9	9·02

The grain as well as the straw are valued at exceptionally low rates even for an outlying district. The grain is priced at $70\frac{1}{2}$ lbs. per rupee. The by-product varies from $11\frac{2}{7}$ cwts. per rupee in the fourth test to $15\frac{2}{7}$ cwts. per rupee in the first. If the cultivation had been more liberal the value of outturn would have been in each case considerably enhanced, and there are good grounds to believe that the burden of assessment is not heavy.

This officer's sesamum tests give results which are by no means satisfactory. In each case the percentage incidence of assessment works out very high, and for this reason, if for no other, the details of the report should have been less

sketchy. I am unable to draw definite conclusions from the reported information; but the unfavourable results reported should warrant in future years the testing of crops grown on similarly classed and similarly cultivated lands. The cultivation is described as indifferent, and the season as not favourable. Two of the fields had been waste for the three previous years. In the third field this year's crop was the second sesamum crop taken after two years' fallow. The seed for each crop was broadcasted in August. This would have necessitated a higher seed rate than if the crops had been drilled. *Til* seed is so small that it is mixed with ashes, dust, or dry powdered cowdung before sowing in order to secure even distribution. It is not at all likely that more than perhaps $\frac{1}{10}$ of the reported quantities could have been sown; and of sound seed even less than that proportion would have sufficed. The outturn, &c., figures are as under :—

	Anna Estimate.	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 21) ...	8	107	353	5 12 6	1 7 5	25·31
Second do. (Exp. No. 22) ...	8	111	357	5 15 10	1 9 9	26·89
Third do. (Exp. No. 23) ...	8	131	382	7 0 5	1 4 5	18·16

Broach.

Experiments on *bájri*, rice and sesamum were arranged for in this district. Mr. Leggatt forwarded one test on each of these crops. Mr. Phirozsháh owing to an accident was prevented from experimenting on the last and substituted, with Collector's permission, wheat instead. His tests are worked out with unusual care and are well reported.

Mr. E. H. E. Leggatt, Assistant Collector.

This officer's report embodies the results of three crop-tests, one on rice, one on *bájri*, and the third on sesamum. Rice was sown alternately with a mixed row of cotton and *tur*. Only the rice was tested (No. 24). It might be said to occupy half the area of the field. Acre outturn, however, based on this calculation, would be extremely fallacious; because if the rice had not been sown at all, the rows of cotton and *tur* would have been no less wide. The season determines, in a great measure, which crop succeeds best. All the crops of a mixture may do well, but it is by no means uncommon to find one or more crops of a mixture comparative failures, and suppressed by the others which thrive better. In the field tested, the cotton and *tur* appear to have thriven at the expense of the rice. The experimenter writes that cotton would bear the chief burden of assessment. He also reports that the rice straw was very short, and, therefore, he puts no value upon it. The inference from the two statements is that the value of the yield of rice was a mere fraction of the value of the outturn from the field. If it were otherwise, the burden of assessment would be excessively heavy. Even if the whole mixed crop had been accurately tested, I doubt very much if the percentage incidence of assessment would have worked out to a moderate figure. The field is reported to be fallowed once in four years. A fallow field is known as a *vásel* field in Broach. The practice of fallowing is common, and is adopted by the best cultivators, who recognise in it a means of keeping the land clean and of economizing manure. A *vásel* field is not a waste field. It is continually undergoing tillage, during the rains and throughout the fair season. The field tested bears an assessment of Rs. 19-8-0 per acre. The rice outturn was worth Rs. 10-2-11.

The *bájri* which was experimented upon (No. 25) had, subordinate to it, *tur, mug* and *chola*. The experimenter reports that the *bájri* was thickly mixed with the other crops. The *bájri* only was tested. The field has black soil assessed at Rs. 11-3-1 per acre. It grows *juvár* and *bájri* in alternate years, the former apparently alone. The *bájri* outturn is reported worth Rs. 12-5-6 per acre or Re. 1-2-5 more than the assessment. The value of the pulse outturn is unknown, and it is useless attempting to gauge the fairness of the assessment from the figures reported.

The third test (No. 26) on *til* furnishes more reliable data. The field has black soil assessed at Rs. 7-2-3 per acre. It grows cotton every second year, and in rotation with it *til* and wheat. In Broach cotton is undoubtedly the rent-paying crop on dry-crop land. The season for sesamum was fair. The cultivation is described as good. No manure was applied. The crop was drilled seasonably in August and ripened in January. The period of growth indicates that there was no lack of moisture in the field. *Til* is, however, a delicate crop, easily damaged by cloudy weather and by other causes. The seed rate, 30 tolas per acre, would have been sufficient only if the seed was quite sound and very carefully sown. An outturn of 155 lbs. per acre classes the crop in local opinion as an average one. The gross value of outturn is Rs. 14-8-6. I think the anna valuation is too high. The percentage incidence works out 49·14. This is exceedingly and probably exceptionally high. I believe, however, that on all average dry-crops, except cotton, grown on the best black soil fields of Broach, the assessment is seldom less, and is often more than $\frac{1}{6}$th of the gross outturn.

Mr. Phirozshâh Pestanji, District Deputy Collector,

Submits three tests which were well conducted and fully reported. The experimenter has exercised much more than average discrimination in reporting details which are exceedingly valuable. The first experiment (No. 27) was taken on rice, which is an important crop of the village occupying 160 acres out of a total of 400 acres under cultivation. In the village (Chorási, Anklesvar táluka), the cultivation of this cereal is extending because the facilities for irrigation are ample, and rice pays better than cotton. A large creek, which is tortuous and shallow, constantly overflows during the monsoon and supplies the water necessary for irrigation. The crop selected was no better than the other crops of the village. The experimenter reports that he could not find an indifferently cultivated field and gives a very pertinent reason. He says nothing but careful and laborious cultivation would pay on the highly assessed *kiári* lands. Mr. Phirozsháh reports that the Chorási cultivators are skilful and industrious, and that the cultivators of rice in the village have a decided advantage in obtaining an ample supply of irrigation water. Elsewhere tanks afford facilities for irrigation; but he reports these to have silted up everywhere and the water supply from these is now insufficient.

The field experimented upon is owned by a Pátidár who is well-to-do, owns three pairs of bullocks, and cultivates in all about 25 acres. The tested field bears an assessment of Rs. 11-4-0 per acre for soil and water combined. The soil is rich black of great depth, and equal to the finest cotton soil of the district. The season was favourable. The rainfall was above average and was well distributed early in the season. The late rains were however scant, and the field was so hard when the rice was reaped that it could not be ploughed for a second crop. The after-crop is usually *láng*, and it has been grown in two of the last three years. In 1891-92 the early rainfall was deficient and cotton replaced rice. The field was well tilled, carefully weeded, and liberally manured. The crop was grown from transplanted seedlings, the seed being sown in May-June and the seedlings planted out in July. The seed-bed was manured at the rate of 32 cart-loads cattle manure per acre, whilst the field had an application of 19 loads per acre. The cultivator owns two milch buffaloes in addition to his work cattle; but the home produced manure is found quite inadequate for the holding. This year the manure applied to the rice field was bought at 8 annas a cart-load, a very moderate rate, considering the essential importance of manure in a heavily assessed district. A 6¼-guntha seed-bed supplied seedlings sufficient for an acre of transplantation. The seed sown on this area of seed-bed was 57½ lbs. This is a high rate. The crop ripened on the 31st of October, and the outturn, &c., results are as under :—

	Anna Estimate.	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 27.	18	2,664	3,230	62 2 5	11 4 0	18·10

The rice straw is perhaps under-valued at 1,230 lbs. per rupee. Still that may be all that it is worth, because *juvár kadbi* and other fodders more suitable for cattle than rice straw are never scant or very dear in Broach.

Bájri was tested (No. 28) in a good black soil field assessed at Rs. 8-13-4 per acre. The field is commanded by a well and grows valuable garden crops such as sugarcane, garlic, onions, coriander, fenugreek, &c. It is essential to the successful cultivation of irrigated garden crops, grown on black land that the land be rested periodically from irrigation, and it is common to have a portion of the garden land annually under dry-crop and a portion under irrigation, alternating the portions thus treated every year. The dry-crop is valuable in affording fodder for the extra number of work cattle, which must necessarily be kept for raising water and for the specially careful tillage of garden land. It is not the dry but the irrigated crops which bring in the greater portion of the revenue. Under the circumstances it is satisfactory to find that *bájri* yielded so well as it did in the field tested. The cultivator was, through illness, unable to watch the crop carefully and it suffered from birds. No manure was applied. It is not likely, however, that that influenced the outturn, as the previous irrigated crops must have been heavily manured, and a fair residue would have remained in the soil. The season was favourable and the tillage good. The seed rate, 3 lbs. per acre, is an under-estimate, I think. The crop sown in June ripened at the end of October and gave the following outturn, &c., results :—

	Anna Estimate.	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 28.	14	800	1,750	27 14 1	8 13 4	31·68

The *bájri kadbi* is under-valued at 1,640 lbs. per rupee. The burden of assessment is not high considering the conditions under which the crop was grown. And there is direct evidence that the garden cultivation is profitable in the fact that although the Government assessment is Rs. 8-13-4 per acre, a tenant has been found willing to pay Rs. 20-4-2 per acre for the field. The tenant has had the field for many years, and has no intention of giving it up.

Mr. Phirozsháh's third test (No. 29) on wheat brings out facts of interest. The field selected is ordinary dry-crop cotton soil assessed at Rs. 4-0-5 per acre. The soil is inferior to the rich deep cotton soil found further away from the coast. The village is a Koli village, and the experimenter hazards the remark that Kolis, at least in the Broach district, are as careful and industrious cultivators as Kunbis. The field was remarkably clean and bore evidence of very careful tillage. It was manured for the wheat, about 14 cart-loads per acre being applied. The occupant owns other fields, which lie further away from the village. These are seldom manured, because the cost of carting so far is considerable, and the available supply is required for land nearer home. The manure applied to the wheat field was the whole home supply of the year. There is nothing unusual in applying a heavy dressing of manure to the crop rotated with cotton, because cotton benefits less from manure

applied directly than from manure applied to the previous crop. The season was not altogether satisfactory. The late rains were deficient. Wheat, however, in common with rabi *juvár* and *láng*, suffered less than cotton, which in Broach is, more or less, a crop of the rabi season. The wheat was drilled in November and ripened on the 20th of February. The period of growth is rather short and indicates that the crop was perhaps hastened to maturity by lack of moisture in the soil. The seed was drilled with a two-coulter drill. The reported seed rate, 60 lbs. per acre, is somewhat higher than usual. The outturn, &c., results are as under:—

	Anna Estimate.	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 29 ...	16	844	1,056	340 1 · 0	4 0 5	11·81

I attach very great importance to the tests on rice and wheat by this officer; because the results obtained are, for an ordinary season, not very far from the average of the better cultivated fields. Throughout the greater part of Broach there is evidence that where the cultivation is liberal the burden of assessment is by no means heavy, but at the same time I can say from personal observation last year that for one liberally cultivated dry-crop field there are four that are not so cultivated; and that owing to the fact that fields situated at a distance from the village are seldom manured, the crops in these were such that the burden of assessment must have been necessarily heavy.

Surat.

Subdivisional officers in this district were directed to conduct three experiments on rice and, time permitting, one or two tests on cold weather crops of sugarcane and gram. Mr. Doderet has submitted three rice tests and also one on sugarcane. Mr. Wood was attached to a Survey Party and was also in charge of a division, and having much to do was unable to conduct any experiments. Mr. Kotvál has sent the required number of tests on rice.

Mr. Mollison, Superintendent of Farms, took a test on indigenous potatoes in this district.

Mr. Forbes, Assistant Superintendent, Gujarát Revenue Survey, who was working in this district, was called upon to test *vál*, sugarcane, cotton and *juvár*. He made an experiment on mixed *juvár* which, for reasons given further on, has been rejected, and owing to transfer he was unable to carry out any other experiments.

Mr. W. Doderet, Assistant Collector,

Sends three carefully reported rice tests and a fourth one on sugarcane. The rice tests (Nos. 30—32) were taken at Bulsár. The selected fields grew an inferior variety called *Kada*, which is the common rice crop of the táluka and forms the staple food-grain of the poorer classes. The rice crop of the first two fields is dependant on rain-fall. A second crop of *láng* is taken annually on the first and is helped by water drained from an adjoining marsh. The second field grows a second crop of *vál* when the late rains are favourable. The third field is under a tank, which can be depended upon to give sufficient water for the rice and for a second crop of *vál* also. This year the rain in September was deficient, with the result that the yields of rice from the first and second fields were slightly diminished, and with the further result that no second crop was taken this year in the latter, because the soil was too dry for ploughing and sowing after the rice was harvested. The owners of the first and third fields are

Bhátela Bráhmans, who are described as clever cultivators. A Dhed woman rents the second field. The experimenter reports that the tenant pays the superior holder Rs. 20 per acre, and also pays the Government assessment. The Collector, however, says that the statement is made under a misapprehension. Rice land, he says, is sublet in Bulsár at Rs. 20 to 22 per acre, but the landlord pays the assessment. The fields tested are assessed at the following rates :—

	Rs.	a.	p.	
First field	14	3	5	per acre.
Second do.	9	9	11	do.
Third do.	23	0	9	do.

The experimenter says that his tests bring out an important fact, *viz*, "that at the original survey the facilities for obtaining water for the second crop, when the rainfall is deficient, have not in every case been uniformly valued in fixing the assessment; *vide* the inequality of the assessment in the case of the experiments Nos. 1, 2 and 3, which is not sufficiently accounted for by the poorer quality of the land in the case of No. 1." It is not clear how Mr. Doderet arrives at his conclusion. This year, with a rainfall timely and ample up to September, the outturns from the fields show that the burden of assessment is lightest on the field bearing the least assessment, and heaviest on the field bearing the highest assessment. It can only be conjectured how far this would be altered if the values of the second crops got from the first field and the third field were added to the values of the rain crops of these fields. It is certain, however, that thereby the incidence would, in each case, be considerably reduced. I take it that the second field bears a less assessment than the first, because the position of the former is such that it does not benefit to the same extent as the latter by ordinary rainfall. The first field lies under a marsh, and although the cultivator does not take water for the rice from the marsh, the position of the field is such that its soil must be kept continuously moist by the natural drainage of the marsh water. In a year of deficient rainfall this field would have a marked advantage over the second, and the third would have a considerable advantage over both. It is clear that there should be, on account of water advantages, a considerable difference in the assessment exigible from each field. Any small difference between fields in the quality of the soil is of minor importance. If tests had been taken on the same fields in a year of unfavourable rainfall, the outturns would, I think, vary in direct relation to the assessments. But Bulsár is not liable to have a deficient rainfall, and on the off chance of that calamity it would not be unwise to conclude that the fields are each fairly assessed.

The crops of each field were grown from transplanted seedlings. It is explained that the seed rate for the first field is high owing to the inferior quality of the land. The seed rate of each field is high.

The respective seed rates and the areas of seed-bed to acre of transplantation for each field are noted below :—

	Seed-bed for acre of transplantation.	Seed sown for acre of transplantation.
	Gunthas.	Lbs.
First field	3¼	229
Second do.	7⅖	181
Third do.	6	153

Each field has black soil. The tillage of each is described as good. The first field was manured with 30 cart-loads per acre of cattle manure, the second with 26 cart-loads and the third with 80 cart-loads per acre. The owner of the last field explained that he had a number of cattle and an ample supply of manure. The crops all ripened in the middle of October. The outturn, &c., figures are as under :—

	Anna Estimate.	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 30) ...	15	2,094	2,531	51 3 10	14 3 5	27·74
Second do. (Exp. No. 31) ...	18	2,698	3,773	63 1 3	9 9 11	15·25
Third do. (Exp. No. 32) ...	20	2,629	3,553	57 14 4	23 0 9	39·80

The grain, although of the same variety, is valued for the first, second and third fields, respectively, at lbs. 43, 45 and 48 per rupee. These differences are attributable to variations in quality.

This officer tested sugarcane (Exp. No. 33) which occupied 1 acre of a number the extent of which is 3 acres 22 gunthas. The field is irrigable from a well, and bears an assessment of Rs. 55-10-0 for soil and water combined. The field has been sublet for 15 years, by the superior holder (a Bráhman) to a Kunbi. The nett annual profit to the Bráhman by the transaction is Rs. 51-9-5 or Rs. 14-8-6 per acre. The Government assessment is Rs. 15-10-8 per acre. But being personal *inám*, the owner pays Government only Rs. 6-15-0 as *salámi* for the whole number and Rs. 3-7-7 as Local Cess. The field in the previous year grew rice with a second crop of *vál* and castor. The soil is crumbling black which is suitable for irrigation and the rent paid by the Kunbi indicates that he intends to grow sugarcane and other garden crops. Under no other system of cultivation could he possibly expect to make a living, and pay the rent, which, inclusive of local rates, &c., is about Rs. 18 per acre. The Kunbi is reported to have sublet the acre under cane to a Koli for Rs. 60 in December 1892. This portion of the number was manured in June 1892 with 40 loads per acre, farm yard manure. Probably also the field was ploughed during the monsoon by the Kunbi. Otherwise the Koli could not have got the field ready for sugarcane as expeditiously as he did. In this manner the very high rent is probably accounted for. The Koli took possession and planted the cane in December. The cultivation was indifferent in this sense that the crop was not sufficiently watered after planting, and the sets germinated so irregularly that a second planting was required to fill up vacancies. *Malbári* canes were planted in the first instance with a plough. 2,700 whole canes were planted per acre, equivalent to 21,600 sets. The whole canes are passed through a tube in the plough and are left deeply imbedded in the furrows. "Owing, however, to the inequality of the canes, much labour is entailed, and the operation brought to a stand-still when the canes stick." The *Vansi* sets were planted in January 1893, and were trodden down with the foot in the soft mud in the usual way, the field having been previously flooded to make the soil soft. The resulting crop was a mixed crop. The tillage was sufficient; the crop was carefully weeded and watered during the fair season twice a month. The early rains were favourable, but the late rains scant. The crop does not appear to have been irrigated during breaks in the rains, nor after the rains upto December. This information must, I think, be erroneous. The *Malbári* and *Vánsi* varieties were respectively 12 and 11 months growing. The former is a soft cane of the Mauritius kind. The *Vánsi* canes were thin and small as compared with the *Malbári*. The following tabulated figures compare the two :—

	Malbári.	Vánsi.
	Lbs.	Lbs.
Average weight of each topped cane ...	4·2	1·5
Percentage of gul to cane	11·3	6·5

The following figures in conjunction with those of the foregoing table indicate that if the whole field had been under *Malbári* cane the outturn results would have been much better. The following outturn is from $\frac{1}{10}$th acre:—

Varieties.	Number of canes topped.	Weight of canes topped and stripped.
		Lbs.
Vánsi	3,112	4,653
Malbári	612	2,587

A three-roller mill was used for expressing the juice, 6 pairs of bullocks, in relays of two pairs at a time, being required to work it. The *gul* was made in the ordinary manner. The crushed cane was found sufficient as fuel. The dry stripped leaves are sold for thatching, whilst the green tops are fed to the cattle working the mill, or are saleable at about one anna a bundle of 40 lbs. The outturn, &c., results are as under:—

	Anna Estimate.	Outturn per Acre.			Value of Outturn, exclusive of green tops fed to cattle.	Assessment per Acre.	Percentage incidence of Assessment.
		Gul.	Tops.	Dry leaves.			
	As.	Lbs.	Lbs.	Bundles.	Rs. a. p.	Rs. a. p.	
Experiment No. 33.	17	5,712	080	1,400	268 4 0	15 10 8	5·83

I think the crop is over-estimated at 17 annas. The experimenter estimates the cost of cultivation, and, notwithstanding the high rent paid, works out a profit to the Koli of Rs. 43-11-0 on the acre of sugarcane.

Mr. Anna Gopál Kotvál, District Deputy Collector,

Submits three rice tests (Nos. 34—36). All the crops yielded well, two of them particularly so. Each crop is estimated at the maximum anna valuation. The season was favourable. Each field was well cultivated and liberally manured, the first with castor cake, the others with ordinary manure. The outturn results go to prove that, although the assessment on rice lands in the Surat district appears high, there is a liberal margin of profit to those cultivators who farm well. Each field has black soil and the respective assessments are Rs. 8-5-5, Rs. 14-8-6 and Rs. 11-12-4 per acre. Fields in the 1st and 3rd tests are dependent on rain water only. They must be favourably placed at a lower level than surrounding fields, because they grow second crops of *vál* and castor mixed every year. The second field is under a tank. It grows no second crop. This year's crop was irrigated 7 times from the tank. The field bears a higher assessment than the other fields, presumably on account of tank assistance. Each field grew a different variety of rice, that of the second field being the most inferior. The crops were grown from transplanted seedlings. The seed rate per acre and area of seed-bed to acre of transplantation are shown below:—

	Area of Seed-bed to acre of transplantation.	Seed sown in seed-bed for one acre of transplantation.
	Gunthas.	Lbs.
First field	4	76
Second do.	4·8	68
Third do.	3·6	67

The seed rates are I think high, still they are much nearer average than those reported above by Mr. Doderet. The outturn, &c., results are as under :—

	Anna Estimate.	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 34) ...	20	2,392	3,100	57 2 5	8 5 5	14·59
Second do. (Exp. No. 35) ...	20	3,586	4,850	79 1 8	14 8 6	18·37
Third do. (Exp. No. 36) ...	20	3,144	6,190	77 4 7	11 12 4	15·23

The tank-assisted field appears to bear a heavier burden of assessment than the others. But if the rainfall had not been timely or if it had been deficient it would doubtless have shown its superiority. On the other hand, the incidence on the other fields would be considerably reduced, if the value of the second crop be added to that on the rain crop.

Mr. J. W. Mollison, Superintendent of Farms,

Submits a test (No. 37) on potatoes. The experiment was made with the object of gauging the fairness of the burden of assessment on garden land in the vicinity of Surat. Garden cultivation is very extensive in the district and is materially helped by an ample supply of manure which is obtainable at a moderate cost from the Surat Municipality. The manure is partially decomposed compost made up of nightsoil, sweepings and rubbish, and there was evidence that for garden crops it proved an active and powerful manure. That was the conclusion arrived at from a minute inspection of the garden land of the villages near Surat. The manure is carted as far as 8 miles. The experimenter is of opinion, having last year studied the cultivation of the district, that the burden of assessment is light on land suitable for irrigated garden crops, with sweet well water, also upon all good *bhata* land. It is moderate on rice land with good water facilities either from position or otherwise. But it is distinctly heavy on purely dry-crop black soil and more particularly on outlying fields situate so far from the villages that manure is seldom or never applied. The following account is taken from his report :—

"The field selected for experiment is a fair average of the rich garden land of the Kumbhárya village. It, like the other garden fields of the village, is in a high state of cultivation, and produces magnificent crops in rapid succession. Throughout this garden tract the well water is perfectly sweet and is found at a moderate depth (about 30 feet). The ordinary garden crops grown are: sugarcane, onions, garlic, cabbages, sweet-potatoes, ginger, turmeric, brinjals, ground-nut and potatoes. Potatoes for planting were formerly either of local production or were obtained from Poona. Owing to the importation from Poona, disease was introduced into the district. Within the last 3 or 4 years Italian seed potatoes bought in Bombay have been extensively grown and have succeeded well. But unlike the local variety these Italian potatoes or any other imported kind will not keep long enough to be used as seed in the following season. Consequently fresh imports are required each year. In the villages round Surat there is only one season for planting potatoes, namely, the cold season. It is impossible to grow them in the monsoon owing to the heavy downpours of rain. The crop tested showed no signs of disease. The cultivators affirm that the local (*tarabdi*) variety is much less liable to disease than imported seed. The *tarabdi* tubers though numerous, 20 to 30 to a stem, are exceedingly small—very few exceed the size of a walnut and they are mostly about the size of a bean. Large and small mixed as lifted were worth Rs. 15 per Khandi of 21 maunds at date of experiment. This is equivalent to 53 lbs. per rupee. In the local market the smallness of size does not depreciate values in comparison with exotic sorts so much as it ought to do. If the demand was purely local this could be understood; but potatoes are largely exported from Surat to Bombay, where the price of large potatoes is much higher than that of small. One reason why the larger exotic varieties do not command a higher price is that they do not keep well when stored and consequently they are forced on the market.

"I was unable to find a field of exotic potatoes in the Kumbhárya village in a fit condition for harvesting at the time when I tested the local variety. But being anxious to have some data to enable me to compare the respective yields, I had the produce lifted from 12

square yards of a field growing Italian potatoes. The crop was ripe but being recently irrigated the soil was not quite dry, and it would not have been fair to the owner of the field to have taken a regular test. Potatoes lifted wet will not keep. I had two beds only dug up. But the beds are formed with such exactness and the crop was so regular throughout, that I am quite satisfied that the outturn from the two beds approximately shows that from the field. Manure was applied directly for this crop and the cultivation was as good as it could be. There was no trace of disease. The tubers were large, 4 to 5 at a stem, and were worth Rs 20 per Khandi. I think the crop may safely be estimated at 18 annas. The field is *inám* land and bears no water rate. Consequently in tabulating the results for each field below, I show only the soil assessment of each :—

	Anna Estimate.	Outturn per Acre.	Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
	As.	Lbs.	Rs. a. p.	Rs. a. p.	
Indigenous potatoes	15	7,513	141 6 3	9 1 0	6·40
Italian potatoes	18	15,327	384 1 9	8 13 0	2·29

"I could not accept as accurate all the figures given by the cultivator as to cost of cultivation of the local variety, and in the following estimate have changed figures which were obviously incorrect. Home labour could not be distinguished from hired labour. In the immediate neighbourhood of Surat, labourers are paid 5 annas a day and women 3 annas. Labour is cheaper in villages 8 or 10 miles distant from Surat, but not much at busy seasons. The rates charged below are fair rates :—

Area of plot 26·97 *gunthas.*

	Rs.	a.	p.
Ploughing 6 times ; 1 man and 1 pair of bullocks, 1 day each time at 14 annas	5	4	0
Clod crushing ; 2 men, 1 day	0	8	0
Making beds ; 4 men, 1 day	1	0	0
Digging pits for sets ; 4 men, 1 day...	1	0	0
Planting and covering sets ; cultivator said, 12 women, 1 day a fairer estimate would be 5 women, 1 day ...	0	10	0
Price of seed, 14 maunds at Rs. 2¼ per maund ; (potatoes dear at planting time, small whole potatoes planted) ...	31	8	0
Field hand-weeded ; 7 women, 1 day	0	14	0
Surface of soil loosened with Khurpa	0	14	0
9 waterings ; 4 bullocks and 2 men ; one watering took a day ; at Re. 1-12-0 each	15	12	0
Harvesting crop, cartage, &c.	8	2	0
Total	65	8	0
Per Acre ...	97	2	4
Add assessment and water rate per Acre ...	17	8	0
Grand Total ...	114	10	4
Value of Outturn per Acre ...	141	6	3
Profit per Acre ...	26	11	11

The residue of manure left from the previous crop would have benefited the potatoes. I have taken no count of this. It is however almost certain that most of the labour was home labour or was paid for on the usual "give and take" system, and the owner not only got a fair rate of wage for the members of his household but a fair margin of profit besides."

Mr. H. D. E. Forbes, Assistant Superintendent, Gujarát Revenue Survey,

Submits a test on *juvár* which had, subordinate to it, *tur* and green gram. Each crop was tested. The experimenter reports that *juvár* was mostly harvested during the Christmas holidays. He asked the Mámlatdár to keep some crops uncut until after the holidays. When Mr. Forbes' camp arrived at the village, only 2 fields remained uncut, and on hearsay evidence he reports the crop selected for experiment to have been 12 to 13 annas as compared with other crops of the village, which are reported to have varied from 8 to 18 annas. The *juvár*, the *tur* and the *mug* were all tested on the same day. It is impossible that each could have ripened at the same time. If the *juvár* was just ripe the *tur* must have been under-ripe; whereas if the *juvár* was over-ripe, which is probable, the cultivator must have been put to considerable cost in watching

the crop, or birds must have done considerable damage. The field bears an assessment of Rs. 5-5-10 per acre and the gross value of outturn per acre works out Rs. 29-5-2, of which nearly Rs. 12 is the valuation put on the *juvár kadbi*. This valuation is decidedly high. The crops of the Surat district were generally full average ones, and I fear Mr. Forbes' test was taken on a crop considerably under average for the district. For this, and for other reasons referred to above, the experiment is not reported.

Tha'na.

Experiments on sugarcane, gram and sesamum were prescribed for this district. Mr. Deshmukh submitted a test on *rági* and two on gram. Mr. Pratt made no experiments and his successor forwarded only one test on gram. Mr. Patvardhan, District Deputy Collector, has sent two tests on gram and one on sugarcane which are well reported.

Mr. L. G. Deshmukh, Assistant Collector,

Reports one test on *nágli* and two on gram. The *nágli* crops of the district were more or less failures, being considerably under average, owing to the excessive rain early in the season and insufficient rain afterwards. The deficiency of outturn was locally estimated at ½ to ⅔ of the normal yield. Although the crop experimented upon is valued at half the maximum standard, the experimenter's notes show that the outturn bears a higher anna estimate than it ought. The yield is apparently about ⅓ of a full crop in an average year. The crop, as usual, was raised from transplanted seedlings. In the previous year *udid* was grown after two years' fallow. No manure was given this year and the cultivation is described as indifferent. The field bears an assessment of Re. 0-3-1 per acre. It is reported that ⅓ acre seed-bed was required for an acre of transplantation. If such was the case, the seed-bed was unnecessarily large. The information is probably wrong, as it is reported that only 3 lbs. of seed was broadcasted on ⅓ acre. A seed-bed of that size should have required perhaps 4 times the reported quantity of seed. The by-product was not valued. The outturn, &c., results are as under:—

	Anna Estimate.	Outturn of grain per Acre.	Value of Produce.	Assessment per Acre.	Percentage incidence of Assessment.
	As.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 38 ...	10	351	7 4 0	0 3 1	2·65

This officer's gram tests (Nos. 39 and 40) were taken on fields of very different characters. One crop was grown on land assessed at Re. 0-3-4 per acre, which grows gram annually as the sole crop of the year. The other crop was a second crop after rice on good land assessed at Rs. 4-2-6 per acre. The field has grown gram as a second crop in two of the last three years. A second crop is taken after the rice, apparently as often as the season proves favourable. The *rabi* field is bunded and water is held in it during the monsoon. Subsequently the grass is cut and the field ploughed for gram. No manure was given. The seed rates, 48 and 44 lbs. per acre, are about average. The by-products were not valued. The season for each field was favourable. The outturn, &c., results are as under:—

	Anna Estimate.	Outturn of pulse per Acre.	Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
	As.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 39) ...	20	564	15 8 0	0 3 4	1·34
Second do. (Exp. No. 40) ...	16	391	10 12 0	4 2 6	38·73

The incidence in the second field is fair for a second crop.

Mr. C. W. M. Hudson, Assistant Collector.

This officer reports one test (No. 41) on gram which yielded exceptionally well. The soil is described as ordinary rice land retentive of moisture and therefore capable of yielding a second crop. Gram was grown this year as well as last after rice. The assessment, Re. 1-9-3 per acre, is apparently very low. Late rains were scant, but the gram was not affected by this circumstance, as the soil held a good deal of moisture, when the rice was reaped. The land was once ploughed and then the seed was broadcasted, 56 lbs. per acre being the seed rate. A second cross ploughing covered the seed. The crop was three months growing. The plants were nipped or pruned at a very early stage in order to encourage branching and the formation of more flowers and fruit. No further attention was given or required. The chaff (*bhusa*) is admitted to be a useful fodder for cattle but was not valued. An outturn of 867 lbs. of pulse per acre, worth Rs. 31-14-6, classes the crop at 12 annas according to local opinion. I think the crop might fairly bear the maximum anna valuation. The incidence works out 4·94 per cent. which for a second crop is a very moderate figure.

Mr. V. R. Patvardhan, District Deputy Collector,

Sends two tests on gram and one on sugarcane. The reports are carefully drawn up and give full information on all points of interest. The outturn of gram from the first field tested is satisfactory, that from the second field is unusually high.

The first field is classed as kharif, but owing to its low-lying position, holds too much water even for rice and only grows rabi crops. Gram is taken every year. The soil is medium black and bears an assessment of Rs. 2-10-8 per acre. The second field has dark brown soil assessed at Rs. 3-3-11. It grows rice every year. The gram followed rice this year, but no second crop had been taken during the 7 previous years. The field is fenced and on this fact depends the possibility of taking second crops. In unfenced fields of the village, even in favourable seasons, second crops are not taken because the village cattle stray at random over the fields after the rice is harvested. In contrasting the results from each field it is to be noted that the season was not alike favourable to each crop. Rain fell in December. The crop in the first field was at the time in bloom, therefore it was slightly damaged. The crop in the other field appears not to have been in flower at the time, therefore the December rain was beneficial. The seed in each case was broadcasted and ploughed in. The experimenter explains that the high seed rates, respectively 86 and 88 lbs. per acre, are due to the fact that the plough did not properly cover the seed and probably not more than ½ of the quantity sown germinated. The seed rates are exactly the same as those reported for gram crops last year by the same officer. No manure was applied to the first field, and in the second none was given either for the rice or the gram. The cultivation in other respects was good. The by-products of each field were neither weighed nor valued. The outturn, &c., results are as under :—

	Anna Estimate.	Outturn of pulse per Acre.	Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
	As.	Lbs.	Rs.	Rs. a. p.	
First field (Exp. No. 42)	16	775	27	2 10 8	9·87
Second do. (Exp. No. 43)	20	1,152	39	3 3 11	8·32

The incidence in the second field, for a second crop, is exceedingly light. The first field is bunded. The area is 2 acres 2 gunthas. If an outlet can be provided for the water which stagnates during the monsoon, the field is unquestionably capable of growing rice, and if artificially drained would, owing to its low-lying position, probably grow second crops every year.

This officer's report on the sugarcane test (No. 44) affords information of interest and value. The cultivation of sugarcane and other garden crops is very extensive along a belt of sandy soil which fringes the Máhim coast. Sugarcane is not grown so much for *gul*-making as for raw eating. The canes are largely exported to Bombay. The village (Yedvan) in which the experiment was made is noted for the *gul* manufactured there. The soil of the selected field is more of a loam than that of the ordinary garden land of the district, which, on account of its sandy character, is often improved in consistence by a heavy application of clay soil carted from the rice fields which lie more inland. The whole of the Máhim garden land is watered from wells which are not deep and the water is so shallow that Persian wheels are the universal water-lifts. The sugarcane is a 10 or 11 months crop planted in May and made into *gul* during March or April. The field experimented upon grows rice during 2 years followed by sugarcane in the third. When the second rice crop was harvested the field was at once ploughed whilst there was yet sufficient moisture left in the soil. Subsequently it was ploughed 4 times during the fair season. The stubble was collected and the clods were crushed by hand and rolled by a plank after the first and second ploughings. No manure was applied before the sets were planted. Ridges 18″ apart were made and beds formed in May. The sets used each contained 3 or 4 joints or nodes and 22,800 of these were planted in the furrows per acre. The crop was watered at short intervals immediately after planting. Three days elapsed between the first and second watering. Five days between the second and the third and then 8 days between each afterwards. Five waterings were given before the rains. At this season the water in the well was very low and as the soil is of a porous character, and as the leakage from an ordinary channel in a sandy soil is considerable, the water was carried by means of vessels from the well to the crop. When the cane stood a foot high it was hand-weeded and castor cake applied. The powdered cake was placed round each root stock and the furrows were levelled up by soil carried from adjacent fields. This operation is apparently necessary to prevent the heavy rainfall of the district standing in the furrows and injuring the cane, which before the soil is added occupies the furrows. The crop was again hand-weeded in August, and a second top dressing of castor cake given. A third dressing of the cake was applied in September. The total quantity given in three applications was approximately 3 tons and 17 cwts. per acre, which at ordinary market rates must have cost Rs. 140 to Rs. 150. When the rains ceased the canes were earthed up, new beds and furrows being formed by the operation. This was necessary for the subsequent irrigation of the crop. About the same time the canes were trashed, wrapped and tied up, the object being to clear away all dead leaves, to protect the canes from damage by jackals, rats, &c., and to prevent the crop from lodging by storms of wind or of rain. No further attention, except watering every eighth day and careful watching, was required until the crop was harvested. The fully mature cane is separated at harvest time from the smaller immature shoots locally called *kheris*. The variety grown was a red black cane called *támbda ûs*. This and the other large soft varieties grown at Máhim were originally introduced from Mauritius. The crop tested is estimated at 16 annas. The yield per acre is as follows :—

	Number of canes per Acre.	Weight of canes per acre topped and stripped.
		Lbs.
Mature canes	25,560	57,989
Immature canes (Kheris) ...	9,300	4,451
Green tops	.....	8,055

The juice of the immature canes when boiled did not crystallize thoroughly. The product was molasses. Good *gul* was made from the mature canes. The *gul* was worth locally 14½ lbs. per rupee ; the molasses 23 lbs. per rupee.

The immature canes yielded apparently 24 per cent. of treacle ; whilst the mature canes gave the following results :—

Juice to cane...	...	70·5 per cent.
Gul to juice ...	...	20·6 „
Gul to cane ...	...	14·5 „

A small proportion of *nágli* flour was used to thicken the *gul* after boiling. These results compare very favourably with the best results of the Poona district, and this perhaps is the more remarkable as a wooden roller mill was used to express the juice.

Wood was used as fuel in boiling the juice. The crushed canes and dry leaves are used as ráb material. The green tops are sold as fodder. The mill is worked by buffaloes in relays, one pair at a time. The value of produce per acre works out as under :—

Lbs.		Rs.	a.	p.
8,422 gul per acre	...	586	8	7
1,067 molasses per acre	...	46	5	11
8,055 green tops	...	13	5	0
Total	...	646	3	6

The field is assessed at Rs. 4-7-9 per acre and the incidence of assessment works out 0·69 per cent.

CENTRAL DIVISION.

Kha'ndesh.

Two experiments on *bájri* and one each on wheat and sesamum were required from each officer in this district. The last crop was not tested as it was all cut before officers went into camp. Messrs. Cadell and Seddon tested linseed instead. Mr. Dodgson could not do the wheat tests as he proceeded on leave and his successor joined too late for that work. Both Messrs. Kázi Kamaruddin and Chitgubi represented that *bájri* and sesamum crops were all cut before they went into the district, and were allowed to take wheat tests instead. Only two experiments are submitted by each.

Mr. C. G. Dodgson, Assistant Collector,

Submits two *bájri* tests (Nos. 45 and 46). One crop is reported above average for the season, the other somewhat below average. Neither field yielded well. The early rains were heavy, but otherwise the season was favourable. Sowing was unnecessarily delayed until September as there was favourable sowing weather in July. Each field has light soil, and grows *bájri* continuously. The tested crops took less than three months to mature, and it is probable each was hastened prematurely to ripeness. No manure was applied to either field. The fields are, respectively, assessed at Re. 0-6-0 and Re. 0-7-4 per acre. The seed rates, 11 and 14 lbs. per acre, are probably about normal for light land in poor condition. The by-product is valued high. The outturn, &c., results are as under :—.

	Anna Estimate.	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	As. p.	
First field (Exp. No. 45) ...	7	140	250	4 1 6	6 0	9·16
Second do. (Exp. No. 46) ...	12	357	533	8 13 8	7 4	5·18

Mr. C. N. Seddon, Assistant Collector,

Submits a *bájri* test which is not satisfactory. The field selected has yellow soil assessed at Re. 0-9-5 per acre and is reported to grow cotton in rotation with *bájri*. The *bájri* had *math* subordinate to it, but the pulse was very poor and was not tested. The outturn figures indicate that the *bájri* also was more or less a failure. At any rate the yield was miserably poor. The seed was sown a month later than usual and the experimenter reports that there was no particular reason for this. The tillage was careless and no manure was applied. Mr. Seddon reports that had the field been well manured and well tilled, the yield would have been very greatly increased. The gross value of outturn per acre comes to Rs. 3-15-4. I cannot accept this as anything near average, because the season for *bájri* seasonably sown was distinctly favourable. The test is not reported.

Mr. Seddon also reports two wheat tests and one on linseed. One wheat field (Exp. No. 47) grew dry-crop and the other (Exp. No. 49) was irrigated and the results from each field may with advantage be compared. The dry-crop field has black cotton soil assessed at Rs. 2-10-8 per acre. It grows wheat, cotton and linseed, but no definite rotation is followed. The season for wheat was fair. The November rainfall was heavy, but there was little or no rain later. No manure was applied, and the cultivation is described as indifferent. The crop was drilled (75 lbs. seed per acre) in October and ripened at the end of January. The straw was very short, and its weight compared with that of the grain is so small that I almost doubt the accuracy of the figures. The grain in this as well as in the other wheat test by this officer is valued at a cheap rate.

The irrigated wheat grew on a number, which grew this year also cotton, castors, garlic, onions, sweet potatoes, tobacco, &c. The field has black soil and is irrigable from a well. The assessment is Rs. 4-9-10 per acre. The area under wheat was lightly manured in the previous year, but no manure was applied for this year's crop. The reported seed rate, 129 lbs. per acre, is high, but irrigated wheat requires more seed than dry-crop. The seed was drilled in October, and the crop ripened at the end of February. The crop, like a good deal of wheat grown in Khándesh, was not an irrigated crop in the true sense of the term; it was only irrigated when there was a decided lack of soil moisture. The field was flooded four times at intervals of a fortnight. If the crop had been watered at regular intervals during the whole period of growth, the occupant would have been almost compelled to have used a liberal application of manure. The by-product (*bhusa*) is valued at 35 lbs. per rupee, an extravagantly high rate. If the by-product in this case is valued at the same rate as the by-product of the dry-crop wheat, and there it is by no means low, the gross value of the irrigated crop would be reduced by Rs. 8-9-6 per acre. The outturn, &c., results from each field are noted below :—

	Anna Estimate.	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Dry-crop field (Exp. No. 47).	12	564	248	15 7 8	2 10 8	17·23
Irrigated do. (Exp. No. 49).	14	992	350	35 12 6	4 9 10	12·8

I do not think the results from the irrigated field are any better than could be obtained in a good season from a good dry-crop field under careful and liberal cultivation.

The linseed tested (No. 48) by this officer yielded fairly. The season was as good as the average season for this crop. The field selected for experiment has black soil and bears an assessment of Rs. 2-11-3 per acre. It grows wheat, cotton and linseed. No manure was applied. The cultivation is described as indifferent. The reported seed rate, 12¼ lbs. per acre, is about the usual rate. An outturn of 377 lbs. per acre of oil-seed, valued at Rs. 19-12-0, is perhaps under-estimated at 10 annas. The incidence, in this case 13·68 per cent., is high in all Mr. Seddon's experiments. As regards the dry-crop tests the high incidence may fairly be attributed to the fact that the fields were selected for experiment, which had not been liberally cultivated, and the effects of poor farming become more noticeable in a season which is not altogether favourable. As regards the irrigated wheat the return, even if reduced on account of the high valuation of the by-product, is as good as the occupant could reasonably expect from an unmanured field.

Mr. P. R. Cadell, Assistant Collector,

Reports a test on linseed and another on wheat. The results are only fair. The season was more favourable for linseed than for wheat, the rainfall being deficient for the latter. Linseed on deep moisture-holding black land requires, during growth, very little rain if there is moisture sufficient for regular germination.

The linseed field (Exp. No. 50) is favourably situate near the town of Bhusával and for this reason needs no manure, at least none is applied. The soil is black and bears an assessment of Rs. 3-10-4 per acre.. Linseed, wheat and cotton are grown according to the prospects of the season, but no definite rotation is followed. The tillage is described as indifferent. The seed was drilled in November and the crop ripened at the end of January. The seed rate, 15 lbs. per acre, is somewhat higher than usual. An outturn of 306 lbs. of oilseed per acre classes the crop, in local opinion, at the average standard. The gross produce was worth Rs. 16-15-1 per acre. The incidence, 21·52 per cent., is high ; but probably when cotton is grown the balance of profit to the cultivator is considerably enhanced. The field, measuring 8 acres 7 gunthas

and assessed at Rs. 30, is sublet to a tenant, who pays Rs. 93 for the whole, presumably inclusive of assessment.

The wheat crop (Exp. No. 51) tested by this officer yielded indifferently. The crop was estimated locally at 13 to 14 annas. This estimate, the experimenter thinks, is high, as the crop suffered from deficiency of late rains. The straw was short. The crop was considered average for the district. The field is favourably situated near Bhusával. It has black soil and is assessed at Rs. 3-8-2 per acre. It grows wheat and cotton in alternate years, and was this year lightly manured. A yield of 449 lbs. grain and 580 lbs. straw per acre was worth Rs. 19-12-10 and the incidence is 17·73 per cent.

Mr. S. B. Chitgubi, District Deputy Collector,

Reports what he calls two ordinary experiments. Two test areas were selected in one patch of wheat (the crop only occupied 20 gunthas) and the results from each test area are reported as a separate experiment. The same officer adopted the same course last year. Of the whole area under wheat ¾ was actually tested, and although there is a considerable difference between the outturns of each area, the average of both will presumably give a fair average of the whole crop. In the report as submitted there were a good many doubtful points, which on reference have not been all satisfactorily cleared by the officer in charge of the district, Mr. Chitgubi having gone on leave.

The field selected for experiment (No. 52) is a tolerably large number growing a variety of crops. The wheat was not irrigated, but there must be some means of irrigation; for tobacco, brinjals, carrots, chillies, sweet potatoes, onions and plantains each occupied separate areas this year, and some of these crops require irrigation assistance. The assessment, Rs. 2 per acre, indicates that the source of irrigation is outside the number. The area under wheat was liberally manured with 20 loads per acre of cotton refuse. The manure cost Re. 0-8-0 per cart-load. The wheat followed a kharif crop of *mug*. The experimenter reports a seed rate of 125 lbs. per acre. On reference it is made clear that the ordinary rate of the district is about 49 lbs. per acre. The seed was drilled on the 1st of November and the crop was ripe on the 20th February. Season was fair and tillage good. The outturn is estimated at 12 annas, but there is a doubt whether this does not mean an average or 16-anna crop. The by-product (*bhusa*) is valued at a very high rate, less than 100 lbs. per rupee. If this valuation had been at a fair rate, the gross value of produce would be reduced by at least Rs. 5 per acre. The acre yield is 721 lbs. grain and 992 lbs. *bhusa*. This outturn is reported worth Rs. 32-15-0. The incidence is 6·07 per cent.

Mr. Kázi Kamruddin, District Deputy Collector,

Submits a test on *bájri* and another on wheat. There is some doubt as to the accuracy of the *bájri* outturn figures, as the sample forwarded to my office weighed 6¼ tolas less than the reported weight. On reference it has transpired that the bag in which the sample was forwarded was not filled and sealed under the supervision of the experimenter and that the man entrusted to despatch the sample kept it a few days before it was posted. It is suggested that meantime ants got at the sample. I accept the reported figures but with some misgiving, as it is more reasonable to suppose that the sample was tampered with than that the experimenter's figures are wrong.

The field selected for experiment (No. 53) is a large number. It grew this year, besides *bájri*, cotton and *jowári* and had nearly ¼ of its area lying waste. *Bájri* with a subordinate pulse was grown on the whole of the field in 1892 and cotton on the whole area in 1891. The field has black soil assessed at Re. 1-9-0 per acre. The season was favourable and the cultivation is described as good. Yet the experimenter's remarks that no manure was applied for four years and that there are spots of *kunda*, a deep-rooted grass, throughout the field, are rather at variance with this statement. The seed was seasonably sown and the crop was ripe at the end of October. It yielded 631 lbs. of grain

and 540 bundles of *kadbi* per acre, together worth Rs. 20-9-7. This is held locally to be an average outturn for the field. The incidence, 7·58 per cent., indicates that the burden of assessment does not press too heavily on the occupant.

The wheat crop tested (No. 54) gave fair results. The field has black cotton soil and grows cotton oftener than any other crop. On a portion of the field cotton was grown two years in succession. *Bájri, jowári*, cotton and *tur* have been grown during the last four years. The field is clean and the tillage is described as good. No manure, however, has been applied for 3 years. The season for wheat was favourable. The crop was drilled in October and ripened early in February. The seed rate, 75 lbs. per acre, is high. A yield of 749 lbs. of grain and 886 lbs. by-product per acre, together worth Rs. 24, classes the crop at the average standard. The field bears an assessment of Rs. 2-7-9 per acre, and the incidence, 10·35 per cent., indicates that a moderate margin of profit was left to the cultivator.

Na'sik.

The programme for this district was not followed. Messrs. Stewart and Hayward were closely engaged with the Yeola disturbance, and the former officer was only able to submit one test. Mr. Thatte sent one test and his explanation of his omission to do the required number is not considered satisfactory by the Collector.

Mr. Hampton, Assistant Superintendent, Deccan Revenue Survey, submitted 19 experiments. The pains taken over the work were misapplied owing to inattention to standing orders. Only four of this officer's tests are reported for reasons given further on.

Mr. R. B. Stewart, Assistant Collector,

Submits what he terms a special test (No. 55), but I cannot class it as such. The field is 16 acres in extent. A revenue peon is the occupant. The tillage work was chiefly performed by contract. The household consists of two brothers, both peons; each has a wife and there are two children. The pay from Government of the two brothers is Rs. 14½ per mensem. In making a special experiment $\frac{1}{5}$th of the holding must be tested. Mr. Stewart's test area was $\frac{1}{80}$th of the occupancy. He does not report whether the crop was average for the district or season. It was rather under average for the field. The occupant does not own his own work cattle. He, however, has a cow and three calves. A *bonâ-fide* cultivator would have a greater supply of home-produced manure for use on the field. No manure was applied to the crop experimented upon. The experimenter attempts to gauge the cost of cultivation, The rates for ploughing and other tillage operations are probably correct, as they are contract rates. Reaping is put at Re. 1-4-0 for the field whilst gathering and bundling cost Rs. 9. These rates are not at all in proportion to what they should be. No charges are made for watching the crop, for threshing the grain or for Local Cess.

The experiment shows, if an average test area was selected, that the gross produce of the field was worth Rs. 184-13-9. The pay of the two brothers is Rs. 174 per annum. These make a total gross income of Rs. 358-13-9. The whole cost of cultivation, if accurately estimated, would be about Rs. 100, leaving a joint annual income for the family of Rs. 258-13-9. The brothers are jointly responsible for an ancestral debt of Rs. 300 and they find difficulty in supporting the household and in paying off the debt. The field experimented upon grows linseed and *jowári* in alternate years. The rainfall was deficient this year in July and August. The field was sufficiently tilled. The seed rate, 7½ lbs. per acre, is slightly under average. The soil is black and is assessed at Re. 1-1-6 per acre. The outturn was 341 lbs. grain and 480 lbs. *kadbi* per acre, together worth Rs. 11-7-8. The *kadbi* is over-valued at 100 lbs. per rupee. The crop is estimated at 14 annas and the incidence works out 9·52 per cent.

Mr. C. M. Thatte, District Deputy Collector,

Reports a gram experiment (No. 56). The field has black soil of superior quality, assessed at Rs. 2-4-5 per acre. Only rabi crops of wheat and gram are

grown ; but the assessment indicates that the field is capable of growing cotton and other kharif crops. The crop experimented upon suffered somewhat for want of rain, and is estimated at 10 annas. No manure was applied and the cultivation was indifferent. The seed was broadcasted. A yield of 460 lbs. pulse and 271 lbs. by-product per acre is valued at Rs. 11-6-5. The percentage incidence of assessment, 19·96, is decidedly high. The experimenter ought to have given reasons for the high incidence. It is only partly explained by poor returns owing to an unfavourable season. On reference Mr. Thatte says the field does not grow cotton, but gives no explanation.

Mr. G. H. Hampton, Assistant Superintendent, Deccan Revenue Survey,

Submits in all nineteen tests, which would have been much more valuable if standing orders had been carefully read and strictly followed by the experimenter.

The first five tests were taken on *bájri*, which had subordinate to it *kulthi* or horse gram. The two crops grew mixed in every fourth row, *bájri* alone in the other three. The fields selected have each light soil fairly characteristic of the poorer soils of the Deccan on which *bájri* is the staple cereal crop. The first four fields grow *bájri* annually, presumably with a subordinate pulse crop. The fifth field grows *bájri* every second year in rotation with gram, wheat and *shálu jowári* grown in the alternate year on different parts of the number. The crop of each field was considered a little better than half a good crop and all bear the same anna valuation, *viz.*, annas 11 to 13. The same seed rate is reported for each field, approximately 6 lbs. of *bájri* and 3 lbs. of *kulthi* being sown per acre. This seed rate is probably that general in the district for a mixed crop of *bájri* and *kulthi* and may or may not be accurate for the fields selected for experiment.

The acre averages are worked out on the assumption that a measure ser of *bájri* from each crop weighed 116¼ tolas and of *kulthi* 120 tolas. The weights could not be checked in my office because only one sample was forwarded and it was less than the contents of a measure ser. There is nothing to show that the grain of each field was equally dry when measured and the grain of one test area might have been superior or inferior in quality to the grain of the other test areas. If there were any variations of this sort, and it is almost certain that there were, then there would have been some difference in the weight of the measure ser samples of *bájri* and *kulthi* from each field.

The crops in the second and fifth fields were attacked by caterpillars. The damage in the former was so great that the crop had to be resown. The caterpillars are called *kharpudya*. They eat the young shoots as they appear above ground. These caterpillars die off during rain. But a long drought came after favourable sowing rain in July. For this reason the season was unfavourable. The first, second and third fields do not appear to have been recently manured. The fourth was manured occasionally but not for the tested crop, and the last was lightly manured three years ago. The outturn, &c., results are as under :—

	Anna Estimate.	Outturn per Acre.				Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.	Remarks
		Grain.		Straw.					
		Bájri.	Kulthi.	Bájri.	Kulthi.				
		Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	As. p.		
First field	11 to 13 annas.	250	74	384	128	8 4 10	7 3	5·46	Tillage good.
Second do.		101	27	276	108	4 3 2	9 10	14·64	Do. fair.
Third do.		178	46	300	160	6 8 3	6 9	6·47	Do. good.
Fourth do.		536	98	1,288	256	17 7 10	15 4	5·48	Overgrown with grass ; tillage careless.
Fifth do.		427	86	864	216	10 10 7	15 11	9·33	Tillage fair.

The experimenter says that as the tested fields are variously assessed, probably the results of all the tests will give a fair average for the district. The results may be average for an unfavourable season ; but there is grave

doubt as to the accuracy of the outturn figures, also as to the correctness of the anna estimate of each crop. I regret that I cannot enter the results in the tabulated statement of the report. Mr. Hampton reports that the occupants each cultivate holdings of considerable extent. They are all in debt. They pay interest at the rate of 12 per cent. per annum. The interest is regularly paid but no part of the original debt.

This officer submits three groundnut experiments (Nos. 57—59). The results may with advantage be compared. A portion of each field is classed as garden land. The earthnut occupied in each case the *bágáyat* portion. In the first field the soil is black. The portion under *bhuimug* grows this crop every second year. *Bájri* is rotated with it. The field grew, besides earthnut this year, sugarcane, wheat, chillies and carrots. A dressing of 25 to 30 loads cattle manure was applied per acre for the groundnut. The second field has mixed black soil. It grew this year besides the tested crop, sugarcane, yam, chillies, *bájri*, wheat, &c. Second crops appear to be taken after *bájri*. The *bájri* and groundnut are grown on the same area in alternate years. The groundnut was heavily manured with 30 to 35 cart-loads per acre of cattle manure. This and the previous fields are irrigable by a *pát* leading from a river and also from wells.

The third field is of a different character. The soil is mixed black with a considerable proportion of lime said to be well suited for groundnut. A portion of the field is called garden land. This portion is commanded by two wells, built before settlement. It was formerly irrigated from a *pát* built from a *bandhára*, but the village people who built the *bandhára* have latterly stopped the supply of water. The field has apparently not been classed for water, and for soil is very lightly assessed. The field was lightly manured for groundnut with 4 or 5 cart-loads of cattle manure per acre. The assessments exigible from each field are as under :—

First field, Rs. 5-13-6 per acre, soil and water.

Second do. Rs. 2-12-6 per acre, soil and water.

Third do. Re. 0-3-0 per acre, soil only.

These rates are according to the revision survey. On reference no satisfactory explanation was given as to the lightness of the assessment of the third field. The field grows *bájri* chiefly. This year it also grew wheat, groundnut and small patches of onions, carrots, &c. The rain of June was heavy, but afterwards the rainfall was deficient and the two old wells in the field did not hold an average supply of water.

Each field was sown in the same way. A furrow was opened by a light plough and the seed was dropped by hand into the furrow and was covered by soil moved in making the next furrow. The reported seed-rate is in each case 50 lbs. per acre. This is about average. The crops took about 5½ months to ripen. The cultivation is described in each case as good which presumably means that the fields were well ploughed before sowing and carefully weeded afterwards. The extent of irrigation is not reported. The outturn, &c., results are as under :—

	Anna Estimate	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Nuts in shell (fresh).	Haulms or fodder.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 57) ...	20	3,610	6,302	122 0 0	5 13 6	4·79
Second do. (Exp. No. 58) ...	20	3,938	6,302	132 0 0	2 12 6	2·10
Third do. (Exp. No. 59) ...	18	1,559	4,000	57 8 0	0 3 0	0·32

The experimenter reports that the whole produce of each field was sold green at Manmád, Yeola and Málegaon. The rate at which the principal product

is valued is the retail price obtainable at these markets. If the occupants of the fields found it possible to retail the whole produce the reported values of outturn might have been obtained, but the cost of selling in this manner must have been considerable. The crop of each field was dug by hand, the diggers taking as wages $\frac{1}{6}$ of the produce. Mr. Hampton reports that 3 sers ($=6\frac{2}{3}$ lbs.) of green nuts, when thoroughly dried, weighed almost exactly 3 lbs., thus losing more than 50 per cent. by dryage. The proportional weight of kernels is reported to have been nearly 43 per cent. of the dry nuts with shells. This information is, I think, inaccurate because it does not at all coincide with that recorded in careful experiments by other officers. I think Mr. Hampton's figures are either wrong or the sample was taken from a crop which was unripe.

This officer's sugarcane experiment (No. 60) is subject to the same adverse criticism as his groundnut tests. The outturn is valued at retail rates, and the gross value of produce mounts up to an inordinately high figure. The occupant had three acres of cane. The test area was $2\frac{1}{2}$ gunthas, being less than the minimum allowed by standing orders. The owner would not cut more canes however, because he could not retail in one day the produce from a larger area. At this rate it would take 7 weeks to sell the whole crop. The reasons given for selling the cane in preference to making *gul* are not valid. It is reported that the Khátedár has quarrelled with his brother; he has a small family; he has to depend upon his own exertions, and being in debt wanted to realize quickly. If the occupant obtained the prices quoted, he must have had a number of people selling for him and at places considerable distances apart. The cane from the test area, which was presumably all sold in one day, would, if the crop was a moderately good one, weigh between $2\frac{1}{2}$ and 3 tons. The produce was not weighed. The canes were simply counted and assorted into three sizes—large, medium and small, and the sizes were respectively valued at $\frac{3}{4}$ anna, $\frac{1}{2}$ anna and $\frac{1}{4}$ anna per cane. The average price, irrespective of size, works out about 7 pies per cane. The cost of selling by retail must have been much more than the cost of *gul* manufacture. For, the very best cane is not worth, for *gul*-making, the prices quoted above. I have taken the average of 5 careful tests on sugarcane in previous years and find that the average number of canes (31,350) per acre of these tests is approximately the same as that (31,024) of the crop tested by Mr. Hampton.

For *gul*-making the former were worth less than half the price which Mr. Hampton quotes, who on reference has said that his prices are correct. He writes: "I had enquiries made in Manmád and Yeola. If I saw a man with a sugarcane on bazár day, I always asked what he had paid for it." I think it is certain that if the crop had been sold standing, the owner would have been glad to get perhaps half the reported gross value of outturn.

The field has black soil which is irrigable from a well. No sugarcane had been previously grown. Wheat and *bájri* followed by gram as a second crop are usually taken. The sugarcane was manured with only 20 cart-loads per acre of ordinary manure. The sets for an acre are reported to have cost Rs. 22. The crop is classed at 16 to 18 annas. The outturn, &c., results are as under:—

Number of canes per Acre.		Value of canes.	Assessment per Acre.	Percentage incidence of Assessment.
		Rs.	Rs. a. p.	
Large canes ..	... 16,032	1,102	1 7 7	0·13
Medium ,, ...	... 7,140			
Small ,, ...	... 7,552			
	31,024			

This officer submits four tests on gram, four on linseed and two on wheat. I regret that I cannot report any of them. With one exception all the test areas are below the prescribed minimum. The exception is that of a wheat test.

This crop was the only standing crop of the district. "So all the crows of the surrounding villages had settled on the field and the men were no match for the crows." It is useless testing a field the produce of which was eaten up by birds, and for this reason the results are not reported. Mr. Hampton must have taken a great deal of trouble over his experiments. He could not, however, have read standing orders and instructions carefully and the accuracy of the reported figures of the *bájri*, gram, linseed and wheat tests is so doubtful that I am compelled to reject these experiments. The reasons given for rejecting the *bájri* tests apply also to the gram, linseed and wheat tests. It is clear that the produce from at least some of the fields was measured before the grain was dry. In reply to a reference Mr. Hampton says he had moved from the táluka in which the grain was measured and weighed before the grain was dry. "There was this difficulty that a ser measure full soon after the crops were threshed would not tally in weight with a ser measure full of grain that had been exposed to the sun till it was forwarded, weeks after it was first weighed." By standing orders experimenters are desired to keep a little more than the contents of the local measures, and, when the grain is thoroughly dry, weigh the contents of the measure when properly filled by the dry grain. The acre average should be worked out from this weighment. The same seed rate exactly is given for each gram crop, for each wheat crop and for each linseed crop. All are less than the usual quantities sown. In 8 fields safflower was subordinate to the principal crop. The safflower was not tested, but its outturn was estimated. The gram, linseed and wheat crops, with one exception, bear the same anna valuation. The yields of fields similarly classed vary, so that it is impossible that the anna valuations throughout could be correct.

Ahmadnagar.

Officers in this district were asked to conduct tests on *bájri* and *jowári*, preference being given to the former. Mr. Gibb made one experiment each on *bájri*, *jowári* and wheat. Mr. Sorábji did one on *bájri* and two on *jowári*. Mr. Vádekar sent in only two tests on *bájri*.

Mr. M. C. Gibb, Assistant Collector,

Submits three tests respectively taken on *bájri*, *jowári* and wheat Each was a mixed crop. None of the subordinate crops were tested. The *bájri* was a mixed crop with *mug*, *math*, *ambádi*, and *til*. The cereal gave a poor outturn and the auxiliary crops practically failed. The field, which has light *mál* land, grows the same mixed crop every year. The assessment is Re. 0-12-8 per acre. No manure was applied and the cultivation was careless, weeding having been neglected. The field selected for experiment was sown three times. The seedlings from the first two sowings were eaten by grass-hoppers. The field was sown a third time, late in the season, and probably suffered in consequence. The crop was under average for the village. It was locally estimated as half a good crop, whilst other seasonably sown crops were reported average or nearly so. A yield of 302 lbs. grain and 250 bundles *kadbi* per acre is valued at Rs. 9-15-7. The outturn figures are not recorded in the tabular statement of the report.

The *jowári* crop experimented upon (No. 61) had subordinate to it safflower and linseed in every fourth row; therefore *jowári* occupied ¾ of the test area; but the outturn averages as recorded show the actual yield of *jowári* from an acre. The outturn of *jowári* is an indefinite proportion of the actual acre yield of the mixed crop. It is not reported whether the subordinate crops promised to yield well or not. The field has black soil and bears an assessment of Re. 0-12-5 per acre. *Jowári* and *bájri*, each having auxiliary row crops, are grown in alternate years. This year the field was deeply ploughed in the fair season and well prepared for the *jowári* which was a rabi crop. No manure was applied. The crop was very uneven over the field. Count was taken of this in selecting test areas. The season was fair. The seed was drilled early in October and the crop was harvested on the 20th January. It yielded 420 lbs. grain and 417 bundles of *kadbi* per acre, together worth Rs. 13-9-1. This is called a 13-anna crop. The incidence, 5·72 per cent., is moderate.

The wheat experimented upon (No. 62) had a sprinkling of safflower. The field has black soil assessed at Re. 1-1-8 per acre. The season for wheat is described as indifferent. The field was ploughed in June, and well harrowed afterwards. The seed was seasonably sown at the end of October. The reported seed rate, 20 lbs. wheat and ¾ lb. safflower, is decidedly under average. The crop took 3½ months to grow. The period of growth indicates that there was little, if any, lack of moisture in the soil. The by-product was neither weighed nor measured and is only valued at 4 annas per acre. A yield of 479 lbs. of grain per acre, which, with the straw, is worth Rs. 12-6-0, classes the crop at 11 annas. The incidence works out 8·92 per cent. The experimenter kept only a ser of wheat. By dryage the grain shrank, so that it did not quite fill the ser measure. This probably accounts for the sample sent to my office weighing 2¾ tolas short of the reported weight. The difference does not affect the accuracy of the acre outturn figures, because Mr. Gibb's calculations were based on the weight of a ½ ser measure of dry grain. He had enough dry grain to properly fill that size of measure.

Mr. Sorábji Padamji, Assistant Collector,

Sends three careful tests, the first on *bájri*, the others on *jowári* with subordinate rows of safflower.

The field on which the *bájri* experiment (No. 63) was made is partly classed as *bágáyat* and partly as dry-crop. The garden portion bears a light assessment and is irrigable from a well which, however, has a scanty supply of water. *Bajri* alone is grown in alternate years with *bájri* and subordinate pulses. In the year when *bájri* alone is taken a second irrigated crop of wheat or gram is grown on a portion of the number. The field has a thin layer of black soil overlying a substratum of lighter coloured earth. The assessment is Re. 0-5-6 per acre. The field was well ploughed and otherwise well tilled for the *bájri*, but only a light dressing of manure was given. The crop, which grew from seed rather unseasonably sown in August, because the first sowing failed, was harvested in November and yielded 677 lbs. grain and 2,060 lbs. of useful by-product per acre. The gross value of outturn comes to Rs. 20-5-10. The crop is, I think, under-estimated at 8 annas. The incidence, which works out 1·68 per cent., indicates that the burden of assessment is very light.

This officer's second and third tests (Nos. 64 and 65) each on *jowári* and safflower may with advantage be compared. Each field grows the same mixed crop every year. The soil is in each case black. The first field is assessed at Re. 0-11-5 per acre and the second at Re. 0-7-6. Neither field was manured, but the former was better tilled than the latter. The crop in the first suffered from cloudy weather in December; that in the second from want of rain. In the first field there were 3 rows of *kardai* to 15 of *jowári*; in the second field it is reported that there were 3 rows of *kardai* to 10 of *jowári*. The *jowári* rows were probably 9 in number. Probably a 3-coulter drill was used and 9 continuous rows of *jowári* alternated with 3 continuous rows of safflower. The first field lies in an outlying village, the other near a táluka station; therefore the *kadbi* and useful by-product of the former is valued at a lower rate than that of the latter. The by-products of each field are valued very low, the rate for *kadbi* being respectively 8·84 cwts. and 6·22 cwts. per rupee. The first field had a higher seed rate than the second, the former being about average. Each field was drilled in September. The first was harvested on the 19th January; the second on the 31st of January. The outturn, &c., results are as under :—

	Anna Estimate.	Outturn per Acre.			Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Jowári grain.	Safflower seed.	Useful by-product			
	As.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
1st field (Exp. No. 64) ...	12	615	66	2,475	14 12 0	0 11 5	4·83
2nd do. (Exp. No. 65) ...	10	447	174	1,960	16 9 11	0 7 6	3·71

The second field is 14 acres 36 gunthas in extent. The assessment is Rs. 7 for the field. The whole number has been leased to a tenant during the last 10 years for Rs. 50 per annum. The superior owner, a Bráhman, pays the Government assessment.

Mr. V. B. Vádekar, District Deputy Collector,

Tested two *bájri* fields (Exp. Nos. 66 and 67). The results may, I think, be accepted as average for an ordinary season. The fields selected are much alike in character. Each has light black soil, retentive of moisture to a certain extent. There was ample sowing rain and each field was drilled early in July. The first field had an application, in May, of ten loads per acre cattle manure. The second field was in the same month manured with 5 loads cattle manure. Each field was well ploughed and carefully tilled. A long break in the rains after sowing affected the crops experimented upon less injuriously than those growing on lighter soils. Fields with thin light soils had to be re-sown, still the crops generally approached the average standard. The fields tested grow *bájri* every year. The reported per acre seed rate in each case is 6 lbs. The crops were reaped on the 23rd and 24th November. The outturn, &c., results are as under:—

	Anna Estimate.	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
1st field (Exp. No. 66) .	16	532	1,341	17 9 4	1 0 0	5·68
2nd do. (Exp. No. 67) .	14	438	889	14 11 8	0 13 8	5·79

Poona.

Ten experiments have in all been received from this district. Mr. Bagnell closely followed the programme laid down for him, *viz.*, one test each on rice, *rági* and *bájri*. Mr. Fry, owing to exigencies of tour, had to alter it a little, and he did two tests on *jowári* and one on gram.

Mr. Young, Divisional Inspector, L. R. and Agriculture, C. D., submits two carefully reported tests, one on spelt wheat and another on groundnut.

Onions and sugarcane were selected by Mr. Mollison for experiment, and one test on each has been reported.

Mr. H. W. J. Bagnell, Assistant Collector,

Reports three tests—one test each on *bájri*, *nágli* and rice. The *bájri* (Exp. No. 68) yielded exceptionally well, yet the anna valuation is only that of an average crop. The experimenter says that the crop was an ordinary one of no exceptional promise. For *bájri* the season was more than ordinarily favourable in the Poona district. The heads of grain were generally well filled owing to absence of rain when the *bájri* flowered, and this circumstance, I have no doubt, helped the outturn considerably although, if casually examined, the crop might not have appeared of exceptional promise.

The field varies in character. One-third of the whole number has soil only 8″ deep, whilst the remainder has good black soil 2 feet deep. The experimenter says the crop throughout was even. No count appears to have been taken as to the variation in the soil in selecting the test area. The following is the sequence of crops taken during the previous 3 years :—

1890-91	... Groundnut.
1891-92	... 1 Bájri. 2 Gram.
1892-93	... 1 Bájri. 2 Gram.

The field is irrigable from the Khadakvásla canal and the second crops of gram as well as the groundnut were irrigated from the canal. No manure was applied for the *bájri*, but the tillage was sufficient. The reported seed rate, 14 lbs. per acre, is slightly above average. The seed was drilled in July and the crop was ripe early in November. It yielded 906 lbs of grain and 3,476 lbs. *kadbi* per acre, together worth Rs. 29-15-3. The field is assessed at Re. 1-15-5 per acre and the incidence works out 6·55 per cent.

On red *mál-varkas* land, assessed at Re. 0-9-6 per acre, *nágli* (Exp. No. 69) was only a middling crop. It was grown from transplanted seedlings, raised on a rábed seed-bed. On a seed-bed of 20 gunthas, 10 loads of cowdung were burnt in March, along with grass as auxiliary ráb material. The area of seed-bed to acre of transplantation is not reported, but the seed rate is stated at 16 lbs. per acre; but how this is arrived at without knowing proportionate area of seed-bed to field is not clear. The field was not manured. It lies fallow for three years and then grows in successive years *nágli*, *jowári* and *til*. There was deficient rain at Dasara (October), otherwise the season would have been quite favourable. Late or *garvi nágli* was grown—a variety superior to *halvi* or early *nágli*.

A yield of 550 lbs. grain and 630 lbs. by-product per acre, together worth Rs. 15-7-6, is estimated locally as a 15-anna crop.

The rice crop tested (No. 70) gave satisfactory results. It is assessed at the maximum anna valuation. The crop was grown from transplanted seedlings. A 12-guntha seed-bed was rábed with 12 cart-loads of cowdung; grass was also burnt, but the quantity burnt is not reported. A seed-bed of the size noted was sown with approximately 50 lbs. seed and apparently furnished seedlings for an acre. But this is not clear. If my conjecture as to the seed rate is right, then the seed rate is very high. Goats are folded in the field to manure it every 4th or 5th year. The soil is sticky and retains too much water to grow a second crop. Rice is grown every year. The assessment is Rs. 2-9-3 per acre, and the burden of assessment does not appear to weigh heavily on the occupant. The crop yielded 2,326 lbs. grain and 3,360 lbs. straw per acre. These together are valued at Rs. 58-7-0.

Mr. T. D. Fry, Assistant Collector,

Sends three crop test reports, two on *jowári*, with, in each field, safflower subordinate to the cereal, and the third on gram also with subordinate rows of safflower. Each crop was a rabi one, and as the October-November rains were scant, the season was unfavourable. *Jowári* and gram were affected unfavourably to a greater extent than safflower by the character of the season.

One *jowári* experiment and one on gram (Nos. 71 and 72) were undertaken on the same field. This field comprises $\frac{2}{3}$rd of a large number, $\frac{1}{3}$rd of which this year was waste. The field has medium black soil assessed at Re. 0-11-2 per acre. It grows *jowári* and safflower every year, small patches being sown annually with gram and safflower. A very light dressing of manure, 8 loads for 29 acres, was applied in May. The subordinate safflower was not quite ripe when the *jowári* was tested; but the safflower in the gram was ready for harvest, and it was experimented upon. The outturn figures thus obtained are held to apply alike to both portions of the field. There can be no great objection to this, as the conditions of cultivation were about the same, and the safflower in each area was locally estimated at the same anna valuation. The gram seed rate is not reported, as authentic information was not obtained.

The second *jowári* test (No. 73) was taken on light friable black soil assessed at Re. 0-13-2 per acre. No manure was given. The cultivation for this as for the other crops experimented upon is described as careful. The field grows *jowári* and *kardai* every year. In this field and the other field tested, the principal and subordinate crops grew in the proportion of 7 to 1. Twenty-one continuous rows of *jowári* alternated with 3 rows of safflower. It is common to sow *jowári* and safflower in this manner through a wide district east of Poona. The proportion of area of cereal to that of oilseed varies between fields. In the fields selected for experiment the respective seed rates were as under :—

			Lbs.
First field...	...	Jowári ...	... 7½
		Safflower ...	... 2
Second do.	...	Gram ...	... not reported.
		Safflower ...	... 2
Third do.	...	Jowári ...	... 5½
		Safflower ...	... 1

The seed was sown in October, and the crops ripened in January. The following table shows the outturn, &c., results :—

	Crop.	Anna Estimate.	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
			Grain.	By-product.			
		As.	Lbs.	Lbs.	Rs. a. p.	As. p.	
First field (Exp. No. 71)...	Jowári ...	11	276	1,420	10 13 7	11 2	6·43
	Safflower ...	16	54				
Second do. (Exp. No. 72) ..	Gram ...	5	139	202	5 0 10	11 2	13·81
	Safflower ...	16	54				
Third do. (Exp. No. 73)...	Jowári ...	13	651	2,260	18 2 2	13 2	4 54
	Safflower ...	20	94				

The crop of the second test was a comparative failure ; therefore the incidence is not unduly high. The result of this test may be accepted as about average for the greater portion of the gram crops of the Poona district, which were exceptionally poor last year where not helped by irrigation.

Mr. F. B. Young, Divisional Inspector, L. R. and Agriculture, C. D.,

Reports 2 well conducted and carefully reported crop tests. The first (No. 74) is on irrigated spelt or *khapli* wheat. The field has deep black soil assessed at Rs. 3-4-1 per acre. The whole number is irrigable from a well assisted by a channel leading from a *bandhára*. The *pát* irrigation is only available with an ordinary rainfall up to the end of November. The sequence of cropping during the past three years indicates that there is enough water only for a portion of the field. The area of the whole number is 8 acres 24 gunthas. This year 3 acres and 15 gunthas were under wheat and ground-nut ; the remainder under dry-crop wheat with safflower. Eighteen cart-loads of ordinary manure per acre were applied to the irrigated portion. The preparatory tillage for the wheat was careful. The field was ploughed with an 8-bullock plough in May and subsequently harrowed three times with a heavy harrow and twice with a light harrow. The seed was drilled first lengthwise and then across the field. The reported seed rate, 86 lbs. per acre, is about average for an irrigated crop. The crop is said to have been bullock-hoed a month after sowing but this was impossible owing to the manner in which the seed was sown. The crop was hand-weeded once, probably twice. There were no weeds. The crop was sown in September and was ripe in February. It is estimated as an 18-anna crop and yielded, per acre, 2,289 lbs. of husked grain worth Rs. 84-8-9, and 2,160 bundles of straw which I think are over-valued at Rs. 10-12-9. The reported gross value per acre is Rs. 95-5-6. The incidence is only 3·41 per cent.

The whole number has been let by the occupant to a tenant. The occupant takes half the produce and pays for ½ seed, ½ manure, ½ cost of *mót* and well fixings and the whole of the assessment. All other expenses of cultivation are borne by the tenant.

This officer's second test (No. 75) on groundnut affords useful information. The selected field has better irrigation facilities than that of the previous test. The portion of the number under groundnut has good deep black soil assessed at, soil and water combined, Rs. 5-1-1 per acre. It is irrigated from a well and also from a *pát* leading from a *bandhára*, which in an ordinary season supplies water to the middle of February. The area of the whole number is 15 acres 30 gunthas, of which 4 acres 28 gunthas is *jirâyat* and the remainder *bágâyat*. The whole assessment is Rs. 62. A tenant has leased the whole number for two years at Rs. 175 per annum. The superior holder pays the assessment ; all expenses of cultivation, &c., are paid by the tenant.

The field is well cultivated, being annually ploughed in the fair season with an 8-bullock plough. Before sowing in June the land was repeatedly harrowed with the heavy and light harrows and dressed with ordinary manure, of which 16 cart-loads per acre were applied. The reported seed rate, 51½ lbs. shelled nuts per acre, is about average. The seed was drilled in June. The crop subsequently was repeatedly handweeded and was evidently dead ripe at harvest time, 15th February. I judge of this because the haulms must have been dry and withered. They weighed less than the nuts. The haulms are reported to have no value. Usually they are green when the crop is dug and are then an excellent fodder. The crop was dug by hand. Women, children and old men were employed and got as wages ¼ of the produce. This is a greater proportion than usual. But it is not so easy to dig the crop on dense black land as on light soil. The season was favourable. The extent of irrigation is not reported. A yield of 2,755 lbs. per acre of unshelled nuts is reported as an average outturn and is valued at Rs. 83-3-9. The incidence works out 6·09 per cent.

Mr. J. W. Mollison, Superintendent of Farms,

Reports a test (No. 76) on red onions. The crop tested occupied the lowest lying and best portion of a large number. Part of the number has poor light soil. The portion experimented upon has mixed black soil and might fairly bear an assessment of Rs. 2-4-0 per acre, the average of the whole number being Re. 1-4-9. The registered owner bought this and several adjoining numbers two years since, and estimates that the portion experimented upon cost him Rs. 300 per acre. Twelve to 15 acres of the whole property might be considered equally valuable. This area is either commanded by a well or could be irrigated from the Khadakvásla canal. But the canal water has to be lifted and half the usual water rate is charged. The land which is irrigated grows sugarcane, plantains, lucerne, &c.

The area under onions grew *kundi* (green fodder *jowári*) in 1892-93 and chillies in 1891-92. As usual the onions were transplanted from a seed-bed. The seed was sown in October. The proportionate area of seed-bed to acre of transplantation was 4·58 gunthas. Nineteen and half pounds seed was sown for an acre of transplantation. If it had been sound, which onion seed seldom is, 5 lbs. less ought to have sufficed.

The preparatory tillage of the field was liberal. The heavy plough was once used. Afterwards the field was four times harrowed. The total application of ordinary farm-yard manure was 43 loads per acre, of which ⅚ was applied before plantation, the remainder as a top-dressing. Beds were formed. The seedlings were carefully lifted from the seed-bed, and half the green tops clipped off before they were transplanted 3 or 4 inches apart in the beds. The seedlings are reported to have been transplanted in December, but it is probable that the correct date was some time in Jauuary. The crop was subsequently hand-weeded and regularly watered. There was an interval of 7 or 8 days between each watering. Water was withheld for 3 weeks before harvest, to allow the soil to dry, so that the onions were lifted clean. The crop was dug on the 7th of May by men by means of ordinary country picks. Women following removed the tops and roots with a sickle. The test area, 2·73 gunthas, was an exact number of beds. This area was below the prescribed minimum, but the available labour did not permit a larger area being tested in one day. The outturn, &c. results are as under :—

	Anna Estimate.	Outturn per Acre.	Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
	As	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 76	17	26,974	147 8 2	1 4 9	0·88

The experiment goes to prove that the formulæ in respect of onions require revision. The crop was undoubtedly a good crop, but better crops are grown in

the Poona district. The outturn approximates that of two tests taken in the Khed táluka in 1889-90, but the value of the crop is much less. The market rate, Rs. 3-8-0 a Khandi of 640 lbs. at date of experiment, was very low. Last year from the same holding onions were sold at Rs. 7-4-0 per Khandi. If kept a few months the tested crop would be worth a much better price; but during storage onions lose weight by dryage. The sample kept lost 11·2 per cent. in 11 days. This loss is allowed for in the reported outturn figures. The figures given by the occupant, if accurate, show that the crop was grown at a loss. All the labour was hired labour.

This officer also submits a sugarcane experiment (No. 77). The field has medium black soil and is assessed at Re. 1-4-9 per acre. It is irrigable from the Khadakvásla canal. The water-rate for sugarcane is Rs. 25 per acre. The crop was liberally cultivated and heavily manured with 56 loads farm-yard manure per acre before plantation and a top-dressing of fish manure in August. The total application cost more than Rs. 200 per acre.

The experiment was undertaken chiefly to determine the area of standing cane required to furnish sets sufficient for replanting an acre of new cane. Concurrently, the number and weight of sets required for an acre of transplantation and other information of interest was also obtained. The cane tested was bought as a standing crop at Rs. 500 per acre. The cane was required for planting the field recently taken up by the Agricultural Department for the experimental cultivation of cane at Mánjri Budruk. The crop experimented upon was quite even. The canes were of moderate length and thickness and for this reason were well suited for replanting. Large coarse canes are not well adapted for sets, because the nodes are so far apart. Ratoon cane provides the best sets, because the nodes are so close together.

A given weight of ratoon cane will furnish a much larger number of sets than the same weight of new canes. If the crop experimented upon had been converted into *gul*, it would have been classed as a 14-anna crop, and it has been estimated at that standard; but as a crop yielding cane suitable for replanting, it could not have been much better.

The agreement with the owner was that the stripped dry leaves should be left on the ground and that the cane should be cut a little above the soil level. The latter condition was necessary, because the owner intended to grow a ratoon crop the following year. The crop was purchased at fair value. This is judged by results. Sets were being sold in the district at Rs. 3 to Rs. 3-8-0 per 1,000, ratoon sets being dearest. The cane from the test area cost Rs. 50. The cost of cutting, stripping, carrying, cutting into sets and weighing the cane cost Rs. 5-14-0. In ordinary practice the cost would have been at least ⅓ less, as weighing the canes and counting the sets added to the cost.

Four gunthas yielded 7,132 lbs. of cane. The cane was cut into 18,117 sets worth, at Rs. 3 per thousand, Rs. 54-5-7. The value of green tops 993 lbs., as fodder, say Rs. 2, added to this, makes a total of Rs. 56-5-7.

The sets were sufficient to plant almost exactly 1 acre and 4 gunthas. Therefore 1 acre of fair cane will replant 11 acres at a cost (for sets) of practically Rs. 50 per acre.

The registered owner bought in 1892 five survey numbers, area 43 acres 25 gunthas, assessed at Rs. 64, for Rs. 12,000. He has since resold 3 survey numbers, area 21 acres 14 gunthas, assessed at Rs. 34, for Rs. 6,500. The above transactions prove the enormously enhanced value of landed property in the district, owing directly to the extended cultivation of sugarcane and indirectly to the irrigation facilities afforded by the Khadakvásla canal. Moderately good land under the canal is worth Rs. 30 to Rs. 40 per acre per annum, and tenants readily agree to pay that rent.

The following shows approximately the cost of cultivation of the crop tested:—

Area—1 acre.

	Rs.	a.	p.
First ploughing with heavy plough and 8 bullocks...	11	0	0
Second and third ploughings	16	0	0
Clod-crushing and levelling	2	0	0
56 loads Farm-yard manure and cartage ...	155	0	0
Spreading do. do.	1	2	0
Ridging	3	0	0
Making water compartments and water-channels by contract	2	4	0
Cost of sets	50	0	0
Carting sets, carrying to beds and planting ...	4	0	0
Watering, manual labour, 24 waterings ...	9	0	0
Water rate for canal water	25	0	0
3 hand-weedings; 1st in April; 2nd in May; 3rd in July	7	0	0
2,400 lbs. of fish manure, cartage and cost of application	52	8	0
Hand digging and making new beds in August ...	9	0	0
Assessment	1	4	9
Interest on invested capital, say, Rs. 630 at 7 per cent.	44	0	0
Total ...	392	2	9
Value of crop ...	500	0	0
Profit per Acre ...	107	13	3

Shola'pur.

In this district Mr. Brown was asked to experiment on rice, *bájri*, linseed, gram and sesamum. He reported on the last four. Mr. Scott was called upon to test *bájri*, rice, linseed and gram. He forwarded 2 gram tests only. He explained that he had arranged for two other tests, but the crop in one case was spoiled by rain and in the other case the harvest was delayed owing to the same cause.

Mr. Young, Divisional Inspector, L. R. and Agriculture, Central Division, submits a gram and a *jowári* test from this district.

Mr. R. C. Brown, Assistant Collector,

Submits in all 5 tests. The first two were taken on *bájri* and *til* which grew in different portions of the same number. With the *bájri* was grown *mug*, maize and *tur*; and with the *til*, *mug* and maize. None of the subordinate crops were tested. The extent of the mixture in each field has not been reported. The experimenter's acre averages are based on weights of measured quantities totally different from the weights of the samples of *bájri* and *til* forwarded to my office. The differences are respectively 45¼ tolas and 42⅗ tolas. On reference no explanation has been offered. I am unable therefore to report the outturn figures in the tabulated statement of the report. The field has rich loamy soil. It lies low and holds well whatever moisture there may be. The season was good. No manure was applied, and there was no attempt at careful cultivation. The *bájri* only yielded 91 lbs. of grain worth, with the straw, Rs. 3-7-6 per acre. The *til* produced 172 lbs. of oil-seed per acre, and this outturn is valued at Rs. 8-4-2.

This officer's third test, on gram, is also unsatisfactory. The crop was sown late, therefore the season was not favourable. The soil is assessed at Re. 0-9-8 per acre. I quote the following from the experimenter's report:—

"The field experimented upon was a very poor soil to look at and the crop a wretched one; but the field is typical of those in this district, the soil being a sort of *murum* and lying high. The rain had not fallen seasonably for the crop, and no artificial means had been taken to improve the outturn. *Jowári* and *kardai* are the usual crops grown in the field and with them gram, linseed and *tur* are sown quite casually and not with any method."

This would indicate that the gram was sown sparingly mixed with the other crops named. On reference the experimenter reported that gram occupied 1

acre or $\frac{1}{20}$ of the whole field. The actual outturn from an acre is 107 lbs. worth Rs. 2-9-10. If gram occupied $\frac{1}{20}$ only of the test area, the outturn is greater than could be obtained from the best land under the most skilful management; whilst if it occupied the whole of the test area, it must have been grown alone, and the outturn is so miserably poor that it is much under average and therefore cannot be reported.

In the fourth test (No. 78) gram and safflower occupied different rows. A reference to the experimenter has elicited that 4 sers of *kardai* and 12 sers of gram were sown per acre. But there is nothing to show the respective areas under each crop. The safflower was not tested. The outturn of gram must, therefore, be taken as an indefinite proportion of the yield from the field. "The crop and soil were both of an excellent description. The soil was rich black and deep, and the crop of gram strong and sound." The experimenter further reports that there was "a little too much rainfall, otherwise the crop would have been the best producible." The cultivation is, however, described as indifferent and the crop is only estimated at 14 annas. Independently of the safflower the gram yielded 606 lbs. pulse per acre, worth Rs. 16-5-10. The by-product was neither weighed nor valued. I have some misgiving in reporting the outturn figures in the tabulated statement of the report.

Mr. Brown's last test (No. 79) is on linseed. It was grown on a field which usually grows *jowari* every year. The soil is black and bears an assessment of 12 annas per acre. The cultivation is described as indifferent. No manure was applied. The season was favourable. The reported seed rate, 25 lbs. per acre, is double what it ought to have been. The seed was sown about the 11th October and the crop was harvested on the 30th January. It yielded 160 lbs. per acre of oilseed, worth Rs. 8-7-0, This was locally considered a 10-anna outturn. The incidence, 8·88 per cent., is moderate.

Mr. G. Scott, District Deputy Collector,

Sends 2 gram tests (Nos. 80 and 81). Each crop was grown on rather inferior soil. The fields are respectively assessed at Re. 0-5-4 and Re. 0-4-5 per acre. These are revision survey rates. The second field is irrigable from a well built since settlement, and the tested crop was irrigated once. In the first field *jowari* is ordinarily grown. Gram is taken occasionally as a change crop, But the occupant is apparently not well-to-do, and did not take the opportunity of thoroughly cultivating the field during the monsoon. This a good farmer would have considered essential for successfully growing a good rabi crop. The field was not ploughed. It was merely harrowed. No manure was applied. The season was fairly good.

The second field experimented upon grew gram after *bajri* in the previous year and *jowari* will be grown next year. The preparatory tillage for the gram was more liberal than in the first field. The heavy plough was used and the field was also twice harrowed. No manure was given. The seed rates are respectively for each field 38 lbs. and 30 lbs. per acre. Each crop was drilled seasonably, and each ripened towards the end of January. The sample ser of gram of the first crop weighed in my office $8\frac{5}{8}$ tolas short. The difference cannot, as suggested by the experimenter, be entirely due to dryage, The by-product was neither weighed nor valued because considered worthless. The outturn, &c., results are as under:—

	Anna Estimate.	Outturn of pulse per Acre.	Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
	As.	Lbs.	Rs. a. p.	As. p.	
First field (Exp. No. 80)	12	352	7 11 4	5 4	4·32
Second do. (Exp. No. 81)	8	398	8 12 0	4 5	3·15

The incidence is very moderate in both tests. The better outturn in the second field may be fairly attributed to better cultivation and the effect of a single watering given to the crop.

Mr. F. B. Young, Divisional Inspector, L. R. and Agriculture, C. D.,

Submits two careful tests, one on *jowari*, the other on gram. The *jowari* field (Exp. No. 82) has black soil which varies in character on different parts of the number. The crop varied with the soil, and to get a fair average, several test areas were selected. The assessment is Re. 1-0-11 per acre. The field extends to 7 acres 22 gunthas. The full assessment is Rs. 8. The field was sold in 1891 for Rs. 300 and was this year rented by a tenant for Rs. 50. The superior holder pays the Government assessment. His net profit is probably about Rs. 5½ per acre. In 1891 the number was let for Rs. 87 and in 1892 for Rs. 70. The field is free from weeds, and it is only ploughed once in 2 or 3 years. This year it was only harrowed, the first time in July and the 2nd time in August. The seed, 10½ lbs. per acre, was drilled in September. This rate is perhaps somewhat over average; but a high seed rate gives better fodder and probably the *kadbi* has an extra value as the field is in the vicinity of Pandharpur. A month after sowing, the crop was bullock-hoed. The season was favourable. A yield of 477 lbs. grain and 2,330 lbs. *kadbi* and chaff was valued at Rs. 19-3-3. This outturn was classed locally at 12 annas.

This officer tested gram (No. 83) in a field which also has changed ownership recently. The whole number measures 34 acres 4 gunthas and bears an assessment of Rs. 38 or Re. 1-1-11 per acre. Half of the number was sold for Rs. 550 or about Rs. 32 per acre. The experiment was undertaken on this half. *Jowa'ri*, safflower and gram generally grow annually on the field. The safflower is probably a mixed crop with the *jowâri*. The gram never occupies the same area in two successive years. Linseed sometimes takes the place of gram. The soil is deep black. The field was last ploughed in 1891-92. In April and again in July it was harrowed, and a month after sowing was bullock-hoed. The seed, 24½ lbs. per acre, was drilled in September. The seed rate is under average. The crop ripened in January and yielded 788 lbs. of pulse and 600 lbs. of useful by-product per acre, worth together Rs. 21-3-2. The cultivator considered the crop a 12-anna one, while the experimenter believed it to be an average crop for the district and the field. The incidence, 5·28 per cent., is moderate.

Sa'ta'ra.

The programme originally settled for this district was only very partially followed. The Collector explains that this was due to frequent changes of officers during the season.

Mr. W. C. Rand, Assistant Collector,

Sends three tests—one on *jowari*, the other two on gram. The *jowari* crop experimented upon (No. 84) may or may not have been average for the village. Most of the other fields were harvested before the test was made. The selected crop was about average of those not harvested. The field has reddish black *mal* soil and bears an assessment of Re. 0-15-10 per acre. *Ba'jri* and *jowa'ri*, each with a subordinate pulse mixture, are grown alternately. *Mug* (green gram) was auxiliary this year to the *jowari*. It was not tested. Occasionally the field is manured, but there was no manure to spare for it this year. The season was fair and the tillage good. The crop was drilled in June and reaped in November. About 12 lbs. per acre is the reported seed rate. It is higher than ordinary. The outturn, independent of the green gram which occupied ⅛ of the field, was 302 lbs. grain and 2,252 lbs. *kadbi*, together worth Rs. 15-7-6. The incidence, 6·41 per cent., is moderate.

This officer's gram tests (Nos. 85 and 86) were taken on black soil fields, assessed respectively at Rs. 4-0-11 and Rs. 4-1-4 per acre. The October rains were insufficient, otherwise the season was favourable. The first field was not directly manured for the gram, but an application of 7½ cart-loads per acre was given for the preceding rain crop. The second field was very slightly manured for the gram. The rotation is undefined, but the former grows mostly rain crops, whilst the latter grows chiefly rabi crops. The assessment of each field indicates that both are capable of being double-cropped during favourable seasons. In each the tillage for the gram is described as good. In both fields gram was a 2nd crop after *udid*. In the first field gram grew alone. In the second there was a sprinkling of linseed and safflower. The auxiliary

crops were not tested. Both fields are held free of assessment by Saranjámdárs. The superior holder of the first field has leased six acres, including the area under the crop experimented upon, to a tenant for Rs. 50, or about double the assessment. The second field is cultivated by a tenant who pays Rs. 25 for the field (2 acres 18 gunthas) or about 2½ times the assessment. Each field was sown seasonably in October and both tests were taken on the 23rd January. The by-product was in neither case weighed nor valued. The outturn, &c., results are as under :—

	Anna Estimate.	Outturn of pulse per Acre.	Value of Outturn	Assessment per Acre.	Percentage incidence of Assessment.
	As.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 85)....	16	438	13 11 10	4 0 11	29·53
Second do. (Exp. No. 86)....	18	540	16 8 1	4 1 4	24·74

The incidence on both fields is for 2nd crops only.

Mr. S. R. Arthur, Assistant Collector,

Submits an interesting sugarcane experiment (No. 87). The sugarcane only occupied a portion of the number. The soil of this area varied considerably, being sandy on one side and gradually changing to black soil on the other. The crop varied with the soil and necessitated the selection of two test areas, one on the best portion of the crop and the other on the poorest. The outturn of one test area varies considerably from that of the other. Sugarcane is taken every third year and follows groundnut which is preceded by *shálu jowári*. The whole number is classed as dry-crop soil, but in part is irrigable from a well constructed since settlement. Various crops were grown this year, *viz.*, sugarcane, *shálu jowári*, groundnut, chillies, irrigated and dry-crop wheat, turmeric, &c. The assessment is Re. 1-14-6 per acre. The field appears to have been well prepared for sugarcane. The sets were planted in April. Before this the field was ploughed 6 times, the first time in January, the last time at the beginning of April. During March and before the last two ploughings 1,200 sheep were folded for 8 nights on the area under cane (1 acre 14 gunthas). Afterwards a dressing of 15 cart-loads ordinary manure per acre was given. Before plantation ridges were drawn and beds formed and flooded. The sets were planted in the furrows, being trampled down in the mud in the ordinary way. Immediately after plantation, the irrigation was frequent. Thereafter water was given once a week. During heavy rain the well irrigation was suspended. At all other seasons it was regular. Fourteen hundred whole canes appear to have been used to provide sets for an acre. If these canes were of ordinary size, they could not have furnished sufficient sets, and they certainly would not have done so, if, as reported, each cane was cut up into 3 or 4 pieces, each piece having 3 or 4 nodes. This would give 4,200 to 5,600 sets per acre, whilst 4 times that number are necessarily required.

In expressing the juice the old fashioned wooden roller *charak* (mill) was used. It was yoked with 2 pairs of bullocks at a time. The percentage weight of *gul* to cane indicates that an iron roller mill would have given better results. The percentage of *gul* to cane is under average. The evaporating pan was capable of boiling about 1,050 lbs. of juice at a time, and about 3 hours elapsed before evaporation was complete. The following results, per acre, were obtained from each test area :—

	Plot A.	Plot B.
No. of canes...	25,700	22,600
	Lbs.	Lbs.
Weight of canes stripped and topped	49,460	30,940
Weight of green tops	19,980	13,620
Weight of juice	29,360	16,620
Weight of gul	5,280	3,040
Percentage of juice to cane	59·3	53·7
Do. gul to juice	18·0	18·3
Do. gul to cane	10·6	9·8

The tops cut from the canes were in part of value for replanting as sets and in part of value only as fodder. The former were valued at Rs. 37-8-0 per acre, the latter at Rs. 20 per acre. The outturn, &c., results of the whole crop are as under :—

	Anna Estimate.	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Gul.	By-product.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 87.	10	4,227	16,805	260 11 2	1 14 6	0·73

Mr. R. J. C. Lord, Assistant Collector,

Submits a *jowári* test (No. 88) which is not in all respects satisfactory. The crop tested had subordinate to it gram and safflower. The auxiliary crops were reaped before the experiment was made. But without personal knowledge Mr. Lord reports that the subsidiary crops practically failed. It is probable that they did, because the *jowári* yielded so well that it would have certainly more or less suppressed any other crop subordinate to it. The crop experimented upon was a second crop after a mixed rain crop of maize and *udid*. The ordinary rotation is undefined, but there is evidence to prove that various crops are grown, that the land is double-cropped occasionally, and that the system of propping could only be followed if the land was liberally farmed. The field is small, being 39 gunthas. It bears an assessment of Rs. 2-9-0 per acre. The soil is mostly black, but is rocky in parts. The field is reported to be rented to a tenant for Rs. 4, the superior holder paying the Government assessment. Thus he only makes a profit of Re. 1-7-0 per acre and derives as a landlord an unusually small advantage from his property.

The field was manured with 8 cart-loads of ordinary manure, per acre, for the rain crop, but no manure was directly applied for the crop under experiment. The tillage is described as good and the season favourable. It is reported that the crop was thrashed two days after harvest. The sample of gram sent to my office weighed nearly 10 tolas short of the reported weight, and it is probable that the sample was not dry when weighed by the experimenter. If such was the case, the reported yield should be reduced by $\frac{1}{12}$ approximately. The outturn, &c., results are as under :—

	Anna Estimate.	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
Experiment No. 88.	12	1,268	2,938	36 15 0	2 9 0	6·93

The incidence for a second crop is extremely light. The anna valuation is, I fear, an under-estimate. The yield, if correctly reported, indicates that the crop was a full maximum one.

Mr. J. M. Cursetji, District Deputy Collector,

Sends a sugarcane test (No. 89) which is fully and carefully reported. The experiment was made on a number which is rented by a Máli for Rs. 115. The Government assessment on the number (7 acres 37 gunthas) inclusive of water rate, is Rs. 34. This the superior holder pays. The Máli is assisted by two brothers, and the combined family numbers 20 individuals. The brothers also jointly own and cultivate 25½ acres of dry-crop land and 6 acres of *bágáyat*, which together are assessed at Rs. 44-8-0.

The sugarcane occupied 1½ acres of the rented field. Chillies were grown on this area in each of the two preceding years. The tenant grew also this year on the same number groundnut, *bájri*, *rála*, *ratálu* and irrigated wheat. The soil is medium black.

The sugarcane was a 12 months' crop planted in April. In the previous November-December the field was heavily folded with sheep. Five hundred sheep were penned on 1½ acres for a month. The shepherd charged Re. 1-9-0 per day for this advantage. During December-January the field was 4 times ploughed

with a heavy plough yoked with 5 pairs of bullocks. Ordinary manure, about 17 loads per acre, was applied after the last ploughing. The field was then apparently ridged with the plough; and beds or water compartments were formed by hand. It is not clear whether whole canes or sets were planted, but 2,720 whole canes were used per acre. These cost Rs. 32. The sets were planted by hand apparently in the ordinary way. After plantation the crop was weeded seven times, and was only watered during 5 consecutive days each month. This could hardly have provided sufficient irrigation except in the rains. The crop certainly did not suffer, for the canes are reported to have been 13 feet long on an average. The experimenter estimates the cost of cultivation and I accept his figures as approximate, excepting cost of irrigation which is much under average. The estimate is otherwise worked out with care and judgment. I cannot accept the valuation of by-product as correct. The green tops which are fed to cattle working the mill and the crushed cane, &c., used as fuel are valued at Rs. 119 per acre. Additional fuel was bought. An iron roller mill worked by 3 relays of 4 bullocks was used to express the juice. The following results were obtained :—

Number of canes per acre	26,888
	Lbs.
Weight of canes per acre	101,060
Do. tops do.	12,373
Do. juice do.	44,380
Do. gul do.	8,998
Percentage juice to cane	43·9
Do. gul to juice	20·9
Do. gul to cane	8·8

The above percentages are much under average. The *gul* was valued at 23 lbs. 19 tolas per rupee—a very cheap rate. At this rate the outturn for an acre, exclusive of the by-product, was worth Rs. 379-10-0.

The estimated cost of cultivation per acre is as under :—

For ordinary labour the following rates are charged : three annas a man, 2 annas a woman and 4 annas for a pair of bullocks. The skilled labour required in gul-making is charged at a higher rate,

	Rs.	a.	p.	Rs.	a.	p.
1. Ploughing 4 times	26	10	8			
2. Manuring—cost of 16 carts, ordinary manure per acre, and folding with sheep	64	9	4			
3. Levelling and preparing beds for planting ...	3	2	8			
4. Cost of sugarcane for sets	32	0	0			
5. Preparing sets and planting	4	6	0			
6. Repairing fence	3	5	4			
7. Weeding, 7 times	17	8	0			
8. Watering once before planting and 5 days per month afterwards	16	4	0			
9. Watching crop	12	0	0			
10. Rent	14	8	2			
11. Baluta	6	10	8			
				201	0	10
12. Harvesting and gul-making—						
Cutting and stripping canes	30	0	0			
Men driving bullocks and working at mill ...	13	12	0			
Fireman and Gulvya	19	14	9			
Hire of mill, pans, &c.	22	12	0			
Oil for mill, &c.	3	3	0			
Extra fuel	10	0	0			
Cloth for Dheps	2	0	0			
Cost of shed	2	10	8			
Hire of bullocks	15	0	0			
				119	4	5
Total expenditure per Acre ...				320	5	3

The probable balance of profit will be as under :—

Value of gul per acre	379	10	0			
Probable value of by-product not utilized during gul-making	20	0	0			
				399	10	0
Expenditure				320	5	3
Profit per Acre Rs.				79	4	9

SOUTHERN DIVISION.

Belgaum.

Ten experiments have been reported from this district. Each assistant was asked to take two tests on *jowári* and one on *bájri*. Mr. Enthoven sent in three tests on *jowári*. His arrangements for a *bájri* test were upset by wet weather. Mr. Boyd conducted one test on *jowári* and another on *bájri*. Mr. Deshpánde, District Deputy Collector, who was to take two tests on *bájri* and one on *jowári*, submitted five tests on *bájri* alone.

Mr. R. E. Enthoven, Assistant Collector,

Submits three tests, each on kharif *jowári* (*gidjol*). The first field (No. 90) grew *tur* and horse gram subordinate to the *jowári*. The seed of the three crops was mixed before sowing. Therefore the proportionate area under each cannot be determined. The *jowári* only was tested and its outturn is an indefinite proportion of the outturn from the field. This experiment does not therefore give data from which the burden of assessment can be accurately gauged. The outturn of green gram might have been approximately determined by the appearance of this crop, when the *jowári* was harvested. Not so in the case of *tur*. It might have appeared a poor insignificant crop at this time, but with a favourable rabi season the plants may have branched out so that the crop may have subsequently yielded well.

The field tested has poor reddish black soil assessed at Re. 0-11-3 per acre. The land was fairly manured, the season was favourable and the cultivation fair. The outturn, 273 lbs. per acre of grain, classes the crop according to local opinion as an average one. The aggregate value of grain and fodder is only Rs. 5-15-7 per acre. The percentage incidence of assessment works out 11·76.

This experimenter's 2nd and 3rd tests (Nos. 91 and 92) are intended to compare the results of good and bad cultivation on similarly classed land. But the comparison is somewhat invidious, inasmuch as, the principal crop only of each field has been tested. Each field has black soil. One is assessed at Re. 1-4-10 per acre, the other at Re. 1-3-0. The former was unmanured, the latter was heavily manured. The unmanured field naturally produced the worst crop. Moreover the field was weedy. In this field horse gram alone was subordinate to the *jowári*. In the other there was considerable variety in the subordinate mixture. Each field was sown rather late in the season (August). The fodder and useful by-product was valued but not actually weighed. The results from each test are tabulated below for comparison :—

	Anna Estimate.	Outturn of grain per Acre.	Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
	As.	Lbs.	Rs. a. p.	Rs. a. p.	
Unmanured field (Exp. No. 91)	16	609	11 9 0	1 4 10	11·26
Manured do. (Exp. No. 92)	20	1,493	27 5 4	1 3 0	4·34

The grain from each crop tested is respectively valued at 57½ lbs., 66 lbs. and 63 lbs. per rupee, which rates even for an outlying district are exceedingly low. The assessments are revision survey rates, and there is evidence that the burden of assessment is light.

Mr. C. C. Boyd, Assistant Collector,

Submits two crop tests (Nos. 93 and 94) one on *jowári*, the other on *bájri*. The fields experimented upon have each red light soil, the productiveness of which depends to a considerable extent upon favourable rainfall. This year there was hardly any rain in the district until August, and the crop experi-

mented upon, which was sown early in July, suffered accordingly. The crops of the vicinity were generally poor. Those tested were average for the year on light soil. The experimenter reports the *jowári* crops of the deep moisture-holding lands of the same táluka to have been very good. *Jowári* yielded better than *bájri*, on the tested fields. The respective outturns were, *jowári* 398 lbs. and *bájri* 274 lbs. of grain per acre. The crops are classed at 14 and 12 annas. I think the latter estimate is high. This fact and the scant early rainfall account for the high incidence of assessment which works out 18·74 per cent. for the latter.

Mr. N. G. Deshpánde, District Deputy Collector,

Submits in all five tests. *Bájri* with *kulthi* subordinate to it was in each case experimented upon. The pulse crop was in each case a comparative failure, and no count was taken of its outturn. The experimenter estimates the outturn of each *bajri* crop at the maximum standard, but it is not at all clear that the anna valuations are right. On the contrary, there is clear evidence to show that the estimates are much too high. The outturns vary considerably. This in part is attributable to the varying quality of the soils of the selected fields. The experimenter's object was apparently to gauge the producing capabilities of fields, the soils of which were locally considered most suitable, less suitable, and least suitable for *bájri*. Two of the fields were manured, three were not. This fact and other circumstances vitiate the desired comparison.

The first field (Exp. No. 95) has mixed red black and calcareous soil, of fair depth. The field slopes and the soil is the detritus from higher levels accumulated on the field by means of embankments which obstruct washing to a still lower level. The upper end of the field is naturally poorer than the lower, and to get an average of the whole two test areas were selected. The soil is classed as very favourable for *bájri*, but it is impossible that it could be so as it varies considerably in depth and character.

The cultivation was inferior. No manure was applied. Weeding was neglected; and *bájri* alone or *bájri* with a subordinate mixture occupied the field in four out of the last five years. The season was not very unfavourable. The rain came late. There was sufficient for sowing. The seed was sown late (3rd or 4th week in August). A long break caused anxiety; but late rains came in time to revive the withering crops of the district and bring them to maturity. The experimenter hazards the opinion that the long break tended to increase the grain produce by checking the luxuriant growth of straw. I am afraid this supposition is erroneous. In any case there are too many deteriorating influences to warrant the experimenter in estimating the crop at the maximum standard, and the same remark applies to all the crops tested by this officer.

The second field (Exp. No. 96) has a thin layer of black soil overlying soft *murum*, and for *bájri*, is locally considered next in quality to that of the first test. The field was level, free from weeds, and was manured fairly by folding sheep. Date of sowing, season and other conditions were like those of the first test.

Each of the next two fields (Exp. Nos. 97 and 98) has a thin layer (5 inches to a foot deep) of red soil overlying *murum*. This description of soil is considered for *bájri* inferior to that of the fields of the first two tests. It forms, however, in the district, the greater portion of the area on which *bájri* is ordinarily grown. The tillage was in each field careful. One field is situate on the top of an eminence and was fairly manured by folding sheep. The other occupies a slope. The lower portion of this field carried the best crop. Test areas in each field were selected to get a fair average. Date of sowing, season and other conditions were identical with those of previous tests.

This officer's fifth test (No. 99) was taken on the higher and poorer portion of a sloping field. Across the lower end of the field an embankment had been formed which helped to accumulate there a deep deposit of red soil. The higher portion has a thin layer of red soil, cut up into hollows by the surface wash caused during heavy rain. The area tested was considered locally the worst description of *bájri* land. The whole field is assessed at Re. 0-10-10 per acre, but the experimenter thinks that the area tested owing to its inferiority could not fairly bear an assessment of more than 2 annas per acre. The results of each test

for convenient comparison are noted below. The valuation of by-product is equally high in all the tests :—

	Anna Estimate	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	As. p.	
First field (Exp. No. 95)	20	552	792	12 8 10	11 7	5·76
Second do. (Exp. No. 96) (manured).	20	318	547	7 10 7	7 10	6·39
Third do. (Exp. No. 97)	20	214	492	5 8 5	3 3	3·36
Fourth do. (Exp. No. 98) (manured).	20	218	475	5 10 3	3 9	4·15
Fifth do. (Exp. No. 99)	20	94	182	2 8 3	Say 2 0	4·97

The assessment is according to revision rates. The experimenter concludes that the above figures "show the accuracy of the valuation and the merits of the system of assessment." If I am right in assuming that the anna estimate, in each case, is considerably higher than it ought to be, the above figures show that the burden of assessment is by no means high.

Bija'pur.

The crops which should have been experimented upon in this district were *bájri* and early and late *jowári*. Mr. Batchelor submitted three well reported tests on early *jowári*. Mr. Chuckerbutty only carried out one *bájri* experiment. Mr. Artál reported one *bájri* and two rabi *jowári* tests.

Mr. Lushington was fully occupied with revision settlement work in the Ratnágiri district and was only able to conduct an experiment on niger-seed.

Mr. S. L. Batchelor, Assistant Collector.

This officer sends three careful experiments (Nos. 100—102) all on *jowári*. The reports are concise, yet all information of importance is given. Each field selected has red *masári* land. This soil is unsuitable for cotton and grows *bájri* and *jowári* in alternate years. The assessments of the fields per acre are respectively Re. 0-7-1, Re. 0-7-9 and Re. 0-13-10. The experimenter is unable to say why the latter field bears the higher assessment. As far as he could judge, the soil was the same as in the other fields, and as regards position, &c., neither of the fields had any apparent advantage over the others. The season was favourable for all kharif crops, excepting late sown *bájri* which was completely wrecked by a heavy downpour of rain in November. For seasonably sown kharif crops rainfall was sufficient and timely. The market rates reported for principal and by-products are unusually low. But on reference this was explained to be due to the bountiful harvest of the district. A poorer outturn in a less favourable year need not therefore necessarily mean diminished profits to the cultivator. The first two fields were fairly manured for this year's crop; the third was liberally manured for the crop of the previous year. The cultivation of the first field was fair but the appearance of the other fields bore no evidence of specially careful tillage. Each crop was seasonably sown and the seed rates are about ordinary. The anna valuations I believe to be correct estimates. The crops were harvested on the 17th and 18th of November and give the following results :—

	Anna Estimate	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	As. p.	
First field (Exp. No. 100)	17	1,250	3,072	25 8 3	7 1	1·73
Second do. (Exp. No. 101)	16	1,252	3,060	25 4 5	7 9	1·91
Third do. (Exp. No. 102)	16	1,177	3,210	24 7 10	13 10	3·53

The fields were selected as normal for the year. The experimenter says "the incidence, especially in first and second fields, seems very low, but I believe would be confirmed by further experiment on the same crop in these tálukas south of the Krishna."

Mr. A. W. G. Chuckerbutty, Assistant Collector,

Sends one crop test (No. 103) on *bájri* which had subordinate to it *tur* and Italian millet (*navani*). Three rows of *bájri* alternated with a single row of *tur* and again with a single row of *navani*. The *bájri* was alone tested. The actual area under *bájri* can be calculated and the acre outturn therefrom determined; but it is by no means certain that the value of the outturn is even an approximation of that of the whole mixed crop of the field. The information reported is of little or no value in determining whether the burden of assessment is fair or otherwise.

The field has black soil and was heavily manured three years since. The crop was sown a fortnight later than it should have been. Rats damaged slightly the seed or seedlings, soon after sowing. The cultivation is described as good. Presuming that *bájri* occupied the whole field without any admixture, then the outturn, &c., results are as under:—

	Anna Estimate	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	As. p.	
Experiment No. 103	11	422	687	9 3 11	6 6	4·39

Mr. R. C. Artál, District Deputy Collector.

This officer sends three crop test reports, one on *bájri* and two on late *jowári*. In the *bájri* (Exp. No. 104) there was a sprinkling of *tur*, *ambádi*, sesamum and *rála*. The subordinate crops were practically failures and were not tested. The failure is attributed to a rank growth of grass locally called famine grass or *wanti kasa* which must have also seriously diminished the *bájri* outturn. The experimenter, however, does not admit such to have been the case. The field experimented upon lies within the fort walls of Bijápur and was Government waste prior to 1892. Two arable crops have been taken since. The field was weedy, probably because it has recently been brought under cultivation. The land no doubt gained fertility whilst it was waste and the crop tested probably benefited considerably from this, also from the manure applied this year. The crop is described as average for the district. This may be true, but the conditions of cultivation were not average, and it would have been better if the experimenter had selected a field from those under ordinary cultivation.

This officer's *jowári* tests (Nos. 105 and 106) are more satisfactory. The favourable season influenced the outturns to a greater extent than any other factor. It is not at all likely that the returns would have been so good as those reported oftener than one year in three, and it is questionable whether the anna estimates are not too low. If the crops are correctly estimated, the burden of assessment is extremely light.

The first *jowári* field has red black soil. It is situate on the banks of the Don river and bears an assessment of Re. 0-9-11 per acre. It is 200 yards from the village and is never manured. It grows *jowári* almost every year, and occasionally wheat and gram. This year the field was not ploughed. The heavy harrow was used as a substitute. The seed, 6½ lbs. per acre, was drilled in October, and the crop ripened in the end of February. Meantime the rainfall was timely and sufficient. The crop was bullock-hoed twice.

The second field has deep black soil and is situate in the Don valley. It is assessed at Re. 0-11-1 per acre. It occasionally grows cotton. *Jowári* has been grown three years out of four since 1890-91. No manure is ever applied. This year the harrow was used as a substitute for the plough. The seed was sown in September and the crop ripened in February; meantime, as in the other field, the bullock hoe was used twice. The season was very favourable. The results from each field are tabulated below:—

	Anna Estimate	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	As. p.	
First field (Exp. No. 105)	16	1,124	2,407	32 3 5	9 11	1·92
Second do. (Exp. No. 106)	14	784	2,110	23 14 3	11 1	2·89

Mr. J. L. Lushington, Divisional Inspector, L. R. and Agriculture, S. D.,

Submits a niger-seed test (No. 107). This crop was grown for the first time, on the better portion of a field with red brown soil, assessed at Re. 0-3-2 per acre. The experimenter thinks that the proportion of assessment exigible from the area under niger-seed should be annas 8 per acre. No manure is ever applied. The field ordinarily grows *jowâri* and *bâjri* with the ordinary subordinate mixtures. It was once ploughed in the fair season, and subsequently was well worked with the heavy harrow before the rains. The seed, 67 tolas per acre, was drilled late in July. The crop was twice bullock-hoed, once fifteen days after sowing, and again at an interval of a fortnight. The season was favourable. The crop was harvested on the 1st of December, and yielded 195½ lbs. seed which classes the crop at 11 annas.

Dha'rwa'r.

Only six tests have been received from this district. Mr. Bonus who was to have conducted 3 tests on *rági* submitted two experiments on that crop and chose *tur* for his third test, being unable to find another suitable field under *rági*. Mr. Swift made one experiment, but it was not submitted in time for inclusion. The District Deputy Collector Mr. Kànga was asked to experiment on *bájri*, linseed, sesamum or *rági*. He has submitted 2 tests on *rági* and a third one on linseed.

Mr. A. R. Bonus, Assistant Collector,

Submits two *rági* tests and a third on *tur*. The latter was a subordinate row crop with *jowâri* and green gram. The *râgi* tests (Nos. 108 and 109) are intended to show the results of bad farming and no manure as compared with more liberal cultivation. The first field is situate near the top of a slope and has red soil which is assessed at Re. 1-0-4 per acre. The other lies on the level top of a hillock. It also has red soil, but the assessment, Re. 0-6-4, indicates that the soil is inferior to that of the first field. The reports are meagre in details. The season is described as good. The cultivation of the first field was 'indifferent,' that of the second 'good'. No manure was applied to the former, whilst 2⅔ cart-loads per acre was applied to the latter. The ordinary crops taken in each field are *jowâri* and *rági*. The crops were each sown seasonably in June. The reported seed rate, 10⅖ lbs. per acre in each case, is high. The first field was ripe in the end of November ; the other early in December. The outturn, &c., results are as under :—

	Anna Estimate.	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 108) ...	8	400	1,405	8 7 0	1 0 4	12·09
Second do. (Exp. No. 109) ...	11	721	2,090	15 7 6	0 6 4	2·62

This officer's third test (No. 110) on *tur* clearly shows how misleading it is to attempt to gauge the outturn of a field by testing one of the crops of a mixture. The *tur* was a subordinate crop. It only occupied every eighth row, yet after the other crops were removed, it branched out so much that the experimenter says it was a fine spreading crop, and if the whole area had been sown with *tur* alone, there would perhaps have been five rows, where there were four.

The outturn figures are valuable, not as having any bearing on the burden of assessment, but as showing the per acre yield of *tur*, when subordinate to another crop. The reported seed rate, 21 lbs. per acre, is at least four times as much as would necessarily be required to sow an acre, if the seed was sown by an ordinary drill only in every eighth row. The actual yield of *tur* from an acre was :—

310 lbs. pulse.
330 „ husk and chaff. } worth Rs. 5-14-2.
692 „ stalks.

The field has good black grey dry-crop soil, assessed at Rs. 2-10-9 per acre. No manure was applied.

Mr. R. E. Kánga, District Deputy Collector,

Sends two tests on *rági* and one on linseed. The two former (Nos. 111 and 112) afford useful comparison. Each *rági* field has red soil. One is assessed at Re. 0-12-2 per acre, the other at Re. 0-3-5. Neither crop was manured, but the first field is close to a village and benefits by the sullage, also by the village cattle standing on it after harvest. The result is that the field never requires manure. In this field *tur* and green gram occupied with the *rági* every 6th row ; whilst in the other field *tur* alone occupied every 6th row. The subordinate crops were not tested. In the first field the seed was sown mixed in every 6th row, and therefore it is impossible to apportion the exact area under each crop. In the second test the exact area under *rági* is culculated and the acre outturn therefrom deduced on the supposition that the whole field was under *rági*. But because *tur* was the subordinate crop, the acre outturn calculated as described is almost certain to be an underestimate of the actual yield. The first field appears to be capable of growing *jowári* with subordinate mixtures in rotation with *rági* and subordinate mixtures. The second field grows the coarser millets, *sáva, navâni* and *rági* rotated with each other and each with *tur*, as an auxiliary row crop. The rainfall was hardly sufficient, still the season was fair. The cultivation of each field is described as good. The seed rates, 8 lbs. and 6½ lbs. respectively per acre, are higher than usual. The first field was sown in the second week of July, the other in the last week of June. Each crop ripened in the third week of December. Both could, I think, have borne a higher anna valuation, particularly that of the first field. The percentage incidence of assessment is very light in each case. The outturn, &c., results are tabulated below:—

	Anna Estimate.	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 111) ...	12	1,253	2,228	21 8 4	0 12 2	3·53
Second do. (Exp. No. 112)	8	421	1,108	7 10 11	0 3 5.	2·77

This officer's linseed test (No. 113) gives no information from which the fairness of the assessment can be judged. The linseed was grown mixed with *jowâri* and gram. Two rows of *jowâri* alternated with a mixed row of *jowâri* and linseed and again with a mixed row of *jowâri* and gram. Only the linseed was tested, and it is impossible to estimate accurately the proportionate area under it. If this was possible then there would be no assurance that the acre outturn calculated from such data by any means approximates in value that of the mixed crops of the field. On the contrary there is an absolute certainty that it would not. The actual quantity of linseed sown, as described above, over an acre was 1·7 lbs. and the actual outturn from this seed was 76 lbs. worth Rs. 3-9-7. The field has black soil, and grows cotton, wheat and *jowâri*, the latter with subsidiary row crops. No manure was applied. The season was favourable and the tillage sufficient. The field bears an assessment of Re. 1-3-3 per acre.

Kola'ba.

Experiments on *rági, vari, gram* and sesamum were called for from this district. Mr. DuBoulay forwarded two tests on *rági* and one each on *vari*, rice and gram ; and Mr. Bhángaonkar one test each on *râgi, vari* and gram.

The Assistant Superintendents of the Konkan Revenue Survey were also called upon to take tests in the neighbourhood of their field operations. They reported their inability to do so as the early crops were all reaped by the time they joined the district and they were working under high pressure when rabi crops were being harvested.

Mr. J. H. DuBoulay, Assistant Collector,

Sends five tests, two on *nágli*, one on *vari*, one on rice and one on gram. The rice test is rejected for reasons given further on. All the other experiments are carefully and fully reported.

The *nâgli* tests (Nos. 114 and 115) may be first contrasted. The first field has red *mâl* soil assessed at Re. 0-3-6 per acre, and grew *halvi* or early *nâgli*. The second field is steep *varkas* land with stones. It bears an assessment of Re. 0-2-6, and grew *garvi* or late *nágli*. The revision survey is about to be introduced. On each field *vari* follows *nágli* after a fallow of 4 years. Then the land again relapses to waste. Each crop was grown from transplanted seedlings, raised on rábed seed-beds. Cowdung was one of the auxiliaries of the ráb material used for the first field. The rábing of the seed-bed of this field was superior to that of the second field. The ráb material of the second field consisted of branchwood, coarse grass, fine grass, rubbish and pounded earth. The seed-bed of the first field was ploughed and presumably the field also. The second field and its seed-bed were dug by hand twice. The seed-bed was dug once before and once after sowing the seed in June, and the field in June and again before transplantation in August. The area of seed-bed to acre of transplantation was $3\frac{1}{3}$ gunthas for the first field, 2 gunthas for the second. The former is a larger seed-bed than would necessarily be required. The respective seed rates per acre work out $5\frac{2}{3}$ lbs. and $6\frac{1}{3}$ lbs. These also are high although the formulæ rates are higher. The tillage is described as indifferent, but in what manner it was so is not shown. The season was on the whole favourable although rain was deficient early in the season and again during the last fortnight in October. The crops are respectively estimated locally at 11 and 12 annas. I think the experimenter is right in concluding that the anna estimate of each would have been more correctly entered at 18 annas. There is little *nágli* grown in the experimenter's charge. Both fields were found in the same village, and, on hearsay evidence, Mr. DuBoulay believes them to be average of similar crops in the neighbourhood. The heads of grain only are reaped, the straw is allowed to stand in the field and is grazed by village cattle. The burden of assessment is light even when due allowance is made for the period of fallow. The outturn, &c., results are tabulated below for easy comparison :—

	Anna Estimate.	Outturn of grain per Acre.	Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
	As.	Lbs.	Rs. a. p.	As. p.	
First field (Exp. No. 114) ...	11	1,478	35 14 1	3 6	0 61
Second do. (Exp. No. 115) ...	12	1,115	27 0 11	2 6	0·58

Vari forms the subject of this officer's third test (No. 116). It followed *nâgli* after a four years' fallow, and the outturn indicates that the land might perhaps profitably bear another crop before it is allowed to go back to waste. The crop occupied a portion of the same number as the field in the second *nágli* test. Although the area under *vari* is large (nearly 4 acres), it and its seed-bed were hand-dug twice. The seed was sown in June and the seedlings transplanted in August. The seed rate works out $2\frac{1}{3}$lbs. per acre, and approximately a 5-guntha seed-bed furnished seedlings sufficient for an acre of transplantation. The area of the seed-bed is larger than necessary. The ráb material used consisted of brush wood, coarse grass, fine grass, rubbish and earth. *Vari* straw like that of *nágli* is left unreaped and is considered to have no commercial value as fodder, but if ráb material was not abundant in the neighbourhood it would have a distinct value for ráb purposes. The season was favourable; the tillage indifferent. The crop

was reaped towards the end of October and yielded 812 lbs. of grain per acre, worth Rs. 16-15-0. This, according to local opinion, classes the crop at 16 annas. The percentage incidence of assessment works out 0·91.

I regret having to reject this officer's fourth test, on salt rice. Upto a certain point the experiment was conducted under his personal supervision, but through some misunderstanding, the Kárkún who had assisted Mr. DuBoulay in his other tests measured, weighed and returned the produce to the owner. This is unfortunate as the test was undertaken with the object of estimating the fairness of the burden of assessment on a field the owner of which has a dispute with his tenants as to the amount of rent which should be paid to him as superior holder. The field bears an assessment of Rs. 2-10-6 per acre, and the owner formerly was content with 4 maunds of rice per acre, equivalent at local market rates to Rs. 5-9-7. Now he demands 5 maunds worth Rs. 7. It is not clear whether the tenant or the landlord pays the Government assessment.

Mr. DuBoulay's gram test (No. 117) gives satisfactory results. The crop was a second crop after rice. The field grows rice every year. A second crop is rarely taken. This year the soil retained sufficient moisture after the rice was reaped, to warrant the cultivator in sowing gram. The method of tillage is not reported but the cultivation is reported as indifferent. The seed was broadcasted, and this partially accounts for the exceptionally high seed rate, 91 lbs. per acre. Half this quantity ought to have been sufficient. The seed was sown late in November and the crop reaped early in February. It yielded 759 lbs. of pulse. The by-product is valued at a nominal figure. In rice tracts gram fodder is considered much less valuable than in the Deccan, where the leaves and husk of gram are carefully mixed with the *bhusa* (chaff and straw) of wheat and other cereals. The mixed fodder thus obtained is greedily eaten by all kinds of stock. Last year, several experimenters reported gram fodder to have no value at all. This is entirely wrong. The crop tested was in local opinion a 13-anna one. This estimate is probably low. The gross acre value of outturn amounts to Rs. 23-13-6. The field bears an assessment of Rs. 5-2-7. The tillage and other expenses connected with the cultivation of gram are small, and it may be concluded that although the percentage incidence of assessment calculated on the 2nd crop appears high, yet the margin of profit accruing to the cultivator was considerable ; and if the value of the rain crop is added, the gross return for the year would bear to the assessment a ratio very favourable to the occupant.

Mr. K. N. Bhángaonkar, District Deputy Collector,

Conducted three experiments, one on *nágli*, one on *vari* and the third on gram. The *nágli* test (No. 118) affords information of value. As usual the crop was grown from transplanted seedlings raised on a rábed seed-bed. The plot under *nágli* was apparently about 10 gunthas. Twenty-two cattle were tied or folded on this plot during two months. The solid excrement was collected and used as ráb material for a seed-bed which measured 6 gunthas. The other ráb materials used for this area were 40 head-loads of grass and 7 cart-loads of household rubbish ; presumbly also pounded earth as usual formed the upper layer. The whole was burnt before the sowing season. On the 6-guntha seed-bed approximately 6½ lbs. of seed was sown. All the seedlings could not have been planted on the area experimented upon. Some may have been sold or used by the occupant elsewhere. The area of seed-bed to acre of transplantation is unknown. The area under *nágli* is only a small portion of a large number, 35 acres 26 gunthas. The soil is *varkas* land and bears an assessment of Rs. 0-2-6 per acre. *Vari* succeeds *nágli* after a fallow of 3 or 4 years. Thus if the whole area is culturable either ⅓ or ⅖ of the whole area is under crop every year. The *vari* taken in the second year is admittedly less profitable than the *nágli* taken in the first. The *nágli* experimented upon was considered above the average of a series of years and is estimated as an 18-anna crop. This may be fairly attributed to the liberal rábing of the seed-bed but perhaps more directly to the fact that the urine of a number of cattle folded on the whole area for two months must have enriched the field to a considerable extent. I am not at all certain therefore that the Collector is right in concluding that without the use of tree loppings an 18-anna crop can be produced in ordinary *varkas* land in a favourable

season and that " where grass, cowdung and household refuse of sorts are available, it appears to be demonstrated that it is unnecessary to skin all the trees and bushes in the neighbourhood of their twigs and branches."

The crop tested yielded 1,973 lbs. grain per acre which with the by-product has a gross value of Rs. 53-8-8. The incidence of assessment works out 0·29, which shows that, notwithstanding the period of fallow, the burden of assessment is light if the whole *varkas* area is capable of cultivation. On this point I have some doubts because the experimenter remarks that rarely more than $\frac{1}{10}$th of any *varkas* field is under cultivation in any one year.

On *varkas* land similarly classed *vari* (Exp. No. 119) also was tested. *Nágli* after a period of fallow was grown in the previous year. The area experimented upon will now again lie waste for 3 years. The crop was grown from transplanted seedlings, but the area of seed-bed to acre of transplantation is unknown. The seed-bed measured 12 gunthas and on this area 10 cart-loads of cowdung, 10 head-loads of coarse gross, 4 head-loads of fine grass, 2 cart-loads of rice husk and presumably as usual an upper layer of earth was burnt before the rains. On this seed-bed approximately $1\frac{2}{3}$ lbs. seed was sown. Ordinarily the seed is much more thickly broadcasted. There is great diversity in the seed rates reported by different officers for *nágli* and *vari*, and careful enquiries should be made in future by experimenters in order to get accurate information. The seedlings were transplanted in July and the crop ripened at the beginning of November. A yield of 527 lbs. of grain and 2,164 lbs. of straw per acre is locally considered a 17-anna outturn in a favourable season. The gross value is Rs. 12-6-0 per acre. The incidence works out 1·26 per cent.

Gram (Exp. No. 120) on a field locally called *Malkhandi* rabi land yielded fairly. The same crop is grown every year but why this should be so is not clear. During the monsoon, rain water is impounded and held until the middle of October in order to prevent the growth of grass and afterwards the moisture is sufficient to mature gram. The field was ploughed early in November and the sowing was completed by the 23rd of that month. The seed was drilled at the rate of 101 lbs. per acre, about $\frac{1}{3}$ of outturn. That quantity was unnecessarily large unless the soil was in rough condition and in poor tilth when the seed was sown. It is reasonable to suppose that it was actually so, in which case a large proportion of the seed would not likely germinate. The by-product as in other rice districts is reported to have no feeding or commercial value. The crop, estimated as a 15-anna one, yielded 353 lbs. pulse, worth Rs. 10-2-11. The field is assessed at Re. 0-12-2 per acre and the percentage incidence indicates that the burden of assessment is fair.

Ratnagiri.

Each officer in this district was asked to conduct two experiments on rice and an equal number on *rági*. The rice tests were duly made, but Messrs. Pánse and Crump found themselves too late in camp for *rági* and substituted experiments on *harik* instead.

The Hon. Mr. G. D. Pánse, Assistant Collector,

Submits three tests—two on rice, and one on *harik*. Voluminous explanatory notes are annexed to the report from which I extract the following information.

Devgad táluka was selected as a suitable district in which to take tests in order to determine whether the Khots have just cause to complain so bitterly as they do as to the lands being heavily assessed. The experimenter concludes from his enquiry that the agitation has not been got up in the interests of the cultivators, who are reported to be willing to pay a higher assessment, " provided they are relieved from the clutches of the Khots ". The Collector says " no one ever supposed that the Khots' howl is in the interest of any but themselves."

The experimenter laments, in a strained manner, over the poorness of the district and the poverty of the people. As to the condition of the people he gives distressing details which it is unnecessary to repeat. He concludes that the district is poor because inferior rice and the still more inferior hill millets

are only grown. Good rice, he says, is imported into the district for the well-to-do only. The local rice is generally only used in making bread. The whole rice produce of the district is reported to be taken by the "avaricious Khots or the greedy Sávkárs", and the poor cultivators live on *harik*, *nágli* and *vari*.

On such poor fare they have to work hard in their fields, often knee-deep in water. The necessary tillage is especially irksome, because the work cattle are small and weak on account of the poor fodder. And a very light plough, a most ineffective implement, has necessarily to be employed. Rice cultivation is reported to be more profitable than *varkas*, but on the other hand it is more trying to the health of the cultivators. The foregoing description indicates that the rayat follows his calling under some disadvantageous circumstances, still the conditions are no worse than those common to all tracts of heavy rainfall. I think the worst feature of the district is that the original survey numbers are divided into numerous *pot* numbers, that the occupancies through this sub-division have become extremely small holdings, that the population is congested, and that the condition of the agricultural classes can only be improved if the people emigrate in great numbers. The experimenter's report indicates that there is no tendency of the people to emigrate from the over-populated tálukas of Ratnágiri. Such is, however, not the case as large numbers migrate annually to Bombay to seek employment.

The experimenter reports that the inferior rice of the district is cultivated in two ways. It may be grown from seedlings raised in a rábed seed-bed or the seed previously sprouted may be broadcasted directly on the field. The experimenter says that the latter is easier and less expensive method than the former. He forgets to note that the sowing of sprouted seed is a risky method of cultivation, depending for its success upon favourable moderate rain falling immediately after sowing; and further that the outturn from broadcasted rice is invariably considerably less than that from transplanted rice if each crop is grown otherwise under like conditions. He selected for test not transplanted rice but two crops of broadcasted rice. Moreover on *varkas* land he chose *harik*, the most inferior of the hill-millets, and which is only grown when the soil has become exhausted for *nágli* or *vari*. Therefore, it is reasonable to suppose that the values of the outturns of the tested crops are under the average of the whole crops of the district.

Mr. Pánse estimates the cost of cultivation of each crop tested and attempts to show the margin of profit accruing to the cultivator. The labour, I presume, is, to a considerable extent, home labour as the holdings are small. Last year he reported the average rate of pay, in the Rájápur táluka of the Ratnágiri district, for unskilled labour at 1¼ annas per day for a man. This year he estimates the pay per day for a man at 2½ annas, for a man and a pair of bullocks at 6 annas, and for a woman at 1½ annas. Women were not employed at any of the tillage operations in one field and only to a very limited extent in the other. I think it is certain that the women and older children of a cultivator's family would have been largely employed at weeding and at harvest, and would have done light work as effectively as men paid at a higher rate. I accept the experimenter's estimates of cost of cultivation of the rice crops as approximately correct on the assumption that the tillage operations were done by hired labour and that men were employed for nearly all operations. This, however, is not likely to have been the case. The margin of profit works out for each field as under :—

	Area of field.		Value of Outturn of field.			Assessment.			Cost of cultivation inclusive of Assessment and Local Cess.			Balance of Profit accruing to cultivator.		
	A.	g.	Rs.	a.	p.	Rs.	a.	p.	Rs.	a.	p.	Rs.	a.	p.
First field (Exp. No. 121) ...	0	38¼	22	1	8	1	0	0	11	4	7¾	10	13	0¼
Second do. (Exp. No. 122) ...	1	34¾	49	3	11	14	1	0	33	8	2½	15	11	8½

The occupants being under Dhárekari tenure the Khot only gets the Government assessment and as that is included in the cost of cultivation the cultivator's profit is as shown.

As regards the *harik* test (No. 123) the figures are by no means satisfactory. The crop was decidedly poor. The anna estimate indicates that under more favourable conditions the outturn might have been doubled. As already noted *harik* is the least important crop of a well defined rotation. The same cultivator must have had, this year, growing on the same holding, the more profitable millets, *nágli* and *vari*. That, however, does not explain why the occupant should grow *harik* at a loss, which is the case if the experimenter's figures are accepted as accurate. There is very little margin for the figures to be far wrong. The margin of profit works out as under :—

	Area of field.	Value of Outturn of field.	Assessment.	Cost of cultivation including Assessment and Local Cess.	Balance of Profit.
	Gunthas.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Experiment No. 123.	26	3 1 7	0 2 0	2 10 4	0 7 3

Mr. Pánse says that the Khot's share is half the balance of profit. This cannot be so. The Collector says "Mr. Pánse must have misunderstood the meaning of the Khoti Settlement Officer's decision. The share fixed by him as payable to the Khot is of the gross produce. If for *varkas* lands in the village it is one-half (it is usually ⅓ or ¼) the Khot would take Re. 1-8-9, leaving the occupant in the position of having lost Re. 1-1-6 by his field according to Mr. Pánse's calculations."

In contrasting the rice tests it has to be noted that the first field grows salt rice, the second field a less inferior variety. As both crops were broadcasted, it is not likely that the seed rates respectively 58 and 120 lbs. per acre, are each correct. The latter is decidedly high. Each field grows rice every year. The former bears an assessment of Re. 1-0-9 per acre. It was not manured. The latter field is assessed at Rs. 7-8-4 per acre, and was manured with cowdung and ashes of burnt leaves mixed together before application, 31 head-loads of cowdung and the ashes of 51 bundles of dry leaves being applied per acre. The outturn, &c., figures are as under :—

	Anna Estimate.	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 121).	12	909	2,986	23 1 10	1 0 9	4·52
Second do. (Exp. No. 122).	12	880	6,282	26 5 3	7 8 4	28·56

The assessment of the second field indicates that the soil is superior rice land calculated to give its best results, when a transplanted crop is grown, the seedlings being grown on a properly rábed seed-bed. I therefore do not attach much importance to the percentage incidence of assessment working out so high, the more particularly so as the experimenter's calculations indicate that a fair margin of profit is left to the occupant.

The *harik* crop was grown on *bharad varkas* land assessed at Re. 0-3-1 per acre. It was the third crop taken since the land lay fallow. The usual rotation is *nágli*, *vari*, *harik*, *til* and then 3 years' fallow. Season and tillage are described as fair. The seed rate, 39 lbs. per acre, is much too high and cannot be accepted as accurate. An outturn of 388 lbs. of grain classes the crop as a 10-anna one. The by-product, 1,567 lbs. of straw per acre, is held to have no value. This of course is wrong. The straw has little or no value as fodder,

but it is useful for ráb purposes and in other ways. The grain was only worth Rs. 4-12-4 per acre. The percentage incidence of assessment works out 4·04.

Mr. L. C. Crump, Assistant Collector,

Submits two tests on rice, and two on *harik*. The experimenter explains that owing to rains it is almost impossible to visit the northern tálukas of his charge in October, and the rice harvest was almost over before he got into camp. The rice crops of the better fields ripen last; therefore probably the crops tested were over average for the district. The field (Exp. No. 124) first tested has soil of ordinary character. It bears a slightly higher assessment than the second field, but the latter is believed locally to be the better of the two. The second field (Exp. No. 125) is favourably situated on a flat at the bottom of a hill, and receives the washings of higher levels, the accumulation of which during the last 20 years may have changed the character of the field considerably since the assessment was fixed. For each field a 10-guntha seed-bed for an acre of transplantation was required. Smaller seed-beds might have sufficed. On the 10-guntha seed-bed for each field, 30 head-loads of cowdung and 40 head-loads of grass were burnt as ráb in March—April. No manure was applied directly to the fields. The fields grew rice every year. No after-crops are ever taken. The seed rate, 72 lbs. per acre, of each rice field is the same. The seedlings were ready for transplantation in July, and the crops ripened early in November. Season and tillage were each fair. The outturn, &c., results are as under :—

	Anna Estimate.	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 124) ...	16	1,772	4,160	53 13 4	9 3 8	17·14
Second do. (Exp. No. 125) ...	16	2,133	5,214	64 15 6	8 1 11	12·49

In each field approximately one-fourth of the gross value is credited to the straw, and I think the value of the by-product is high. On reference the experimenter did not admit such to be the case.

The *harik* tests (Nos. 126 and 127) were conducted on *bharad varkas* fields, one assessed at Re. 0-2-9, the other at annas 2 per acre. Each field lies fallow at intervals for a considerable period—the first field for 5 years and the second for 8 years between each period of cropping. The first field is fairly flat, the second very steep and stony. It is reported that in each field paddy takes a place in the rotation; but this could hardly be possible on the second field. In the first *harik* was the crop of the third year since the land was waste. In the second field it was the second crop taken. The previous crops taken were *nágli* followed by *nágli* in the first field and *nágli* in the second field. The fields were rábed with cowdung, branch-wood, and grass for the *nágli* crop but no manure was applied for the *harik*. The experimenter correctly estimates this crop, as the poorest of the rotation. In the first field, season and tillage was each good; in the second, season good, tillage fair. The seed rate, 37 lbs. per acre, was the same in each field. The rate is high. On reference, the experimenter explained that steep stony *varkas* land requires a higher seed rate than superior *varkas*. This would indicate that there should have been a difference between the seed rates of the tested fields. The seed for each crop was broadcasted in June, and the crops were harvested in the middle of November. The outturn, &c., results are as under :—

	Anna Estimate.	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 126) ...	17	942	1,350	14 9 7	0 2 9	1·17
Second do. (Exp. No. 127) ...	17	458	800	7 4 1	0 2 0	1·72

Mr. S. S. Kamlápurkar, District Deputy Collector,

Conducted 4 careful tests, two on rice and two on *nágli*. The rice crops (Exp. Nos. 128 and 129) were each grown from broadcasted seed, which for the first field was artificially sprouted before sowing. The method adopted for germinating the seed is as follows :—The grain is put in a basket and soaked with cold water. Afterwards boiling water is poured over it, and then leaves and grass are spread over the seed and weighted down with a stone. Each day sufficient cold water is added to keep the seed sufficiently moist. In three days the seed germinates and is ready for sowing. In each field rice is grown every year. The first field has red soil. The surface slopes slightly. It bears an assessment of Rs. 5-12-7 per acre. *Vánksál*, a fine variety, was sown. The field was not rábed, but 60 head-loads of refuse manure were applied per acre in May, and 60 head-loads of cowdung per acre at time of sowing. The field was ploughed 6 times before the soil was worked into that consistence of mud necessary for sowing. It was not weeded, and the cultivation is described as indifferent. The owner of the field is a Brahman who hired labour for its cultivation. On half the field, *váingan*, *i.e.* hot weather irrigated rice, is grown annually. The second field has brown alluvial soil. The assessment is Rs. 4-0-6 per acre. It lies low, and benefits by washings from higher levels. The superior holder is a Brahman. He let the field to a Kunbi for Rs. 18, the Government assessment being Rs. 13. The whole field was rábed by the tenant with 30 head-loads of cowdung, 40 bundles of grass, and 30 head-loads of leaves per acre. A coarse variety of rice was grown. The field was ploughed in May, and the clods crushed. The seed was broadcasted about the end of May, when there were signs of rain. In July the crop was hand-weeded. The season is described as fair and the tillage good. The seed rates, 67 lbs. and 68 lbs. for each field, respectively, are about average. Each crop ripened about the beginning of November. The outturn, &c., results are as under :—

	Anna Estimate.	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 128) ...	12	1,170	2,250	42 0 6	5 12 7	13.76
Second do. (Exp. No. 129) ...	14	1,542	4,000	57 8 0	4 0 6	7·01

The value of the by-product in each case is decidedly high. At the market rates quoted, the acre values of the straw, &c., of each crop are Rs. 7 and Rs. 12-8-0. The percentage incidence of assessment of the first field is rather high. But if the value of the second crop taken be added to that of the rain crop, the incidence figure would be reduced considerably.

The *nágli* crops tested by this officer (Exp. Nos. 130 and 131) each yielded well considering the character of the cultivation. The soil of each field is described as red and sandy. One field bears an assessment of Re. 1-0-1 per acre, the other an assessment of annas 4. Each field slopes and is situate on the bank of a *nála*. The crops were raised from transplanted seedlings, which were grown on rábed seed-beds having better soils than those of the fields. A good many seedlings were washed away by heavy rain. Making no allowance for this, a 12-guntha seed-bed was required for the former and 14⅔-guntha seed-bed for the latter per acre of transplantation. Under favourable conditions half of these areas would have sufficed.

The ráb material for the first field (6-guntha seed-bed) was 25 loads dried cowdung, 30 loads branch-wood, 20 loads grass, 5 loads of *harik* straw, and a quantity of fine earth. For the second field the same ráb was used on 7⅓ gunthas. The fields are not ploughed for the reason that if stirred and loosened the soil is swept away by rain. The grass, &c., which springs up is reaped and removed 2 or 3 days before the seedlings are transplanted in July. The seedlings are planted in holes made 3 or 4 inches apart with a sharp pointed piece of bamboo. A portion of the second field suffered from blight, but test areas were chosen to

get a fair average of the whole crop. The season for each crop was favourable. The tillage of the first field is described as good, of the second indifferent, which means presumably that one field was weeded more carefully than the other. Each crop ripened at the middle of November. I tabulate the outturn, &c., results from each field below; but it should be understood that the yields would not bear comparison with that of the same crop grown on ordinary *varkas* land, the conditions of soil, &c., being entirely different:—

	Anna Estimate.	Outturn per Acre.		Value of Outturn.	Assessment per Acre.	Percentage incidence of Assessment.
		Grain.	Straw.			
	As.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	
First field (Exp. No. 130) ...	14	1,275	1,050	34 3 10	1 0 1	2·93
Second do. (Exp. No. 131) ...	12	996	1,100	27 10 3	0 4 0	0·90

The by-products in each case are valued rather high. The first field is classed as rabi land, and the experimenter suggests that if a rabi crop had been grown, and if the field had been tilled in the manner necessary for a rabi crop, the outturn would have been worth more and the percentage incidence of assessment less. I doubt this. I think the owner probably cultivates in the manner which pays him best.

Ka'nara.

One experiment each on *rági*, on early and on late rice were directed to be carried out in this district. But owing to Mr. Divátia's absence on privilege leave and orders about the transfer of Mr. Hudson no tests could be taken on *rági*. Mr. McNeill who succeeded Mr. Hudson was prevented from testing late rice owing to his absence with a Survey Party.

Mr. N. B. Divátia, Assistant Collector,

Submits two tests, one on early rice, the second on *vaingan* or hot weather irrigated rice. Both reports are carefully drawn up, and the latter affords especially useful information. The field growing the early rice (Exp. No. 132) was one in Sungsál, a ghát village of the Ankola táluka. There were a large number of fields to select from, and the experimenter believes the crop to have been an average one for the district. The soil is dark brown and bears an assessment of Rs. 2-12-3 per acre. The field grows rice every year, but no second crop. A light dressing of manure was given to the field and a much heavier dressing to the seed-bed. The manure consisted of cowdung and green forest leaves fermented together. This compost with dry leaves was applied to the seed-bed before sowing, and to the field during the tillage before transplantation. A 9-guntha seed-bed (approximately) furnished seedlings sufficient for an acre of transplantation. On a seed-bed of this size 15½ lbs. of seed was broadcasted. The seed-bed was larger than should have been necessary for the quantity of seed. The seed was sown in the end of June or the beginning of July, and the seedlings were transplanted in August. The crop ripened early in December. Season and cultivation are each described as good. The crop yielded per acre 2,745 lbs. grain and 6,353 lbs. straw, worth together Rs. 74-1-7. This outturn is, I think, considerably under-rated at 12 annas. The percentage incidence of assessment is decidedly light. The experimenter refers to the lightness of the burden of assessment as indicated by the results of this test, as compared with the high incidence of assessment, as shown by his rice test taken in the Kárwár táluka, in the same charge last year. I find that although the incidence of assessment was high, 16·96 per cent. in last year's test, still it was partially accounted for by excessive late rains which damaged the crop and by indifferent cultivation. The experimenter thinks that the wide difference in the incidence of the two tests points to there being some truth in the general complaint of the people that the Kárwár táluka has been rather heavily assessed. If he believes such to be the case, a more reliable comparison could

have been made if he had selected for test in the same year an average rice crop of the Kárwár táluka and an average rice crop of the ghát villages of his charge. The rice cultivators of the ghát villages of his charge are apparently satisfied with the assessment, and so they well may be, if a 12-anna rice crop, cultivated in a very ordinary manner, is, on an average, worth Rs. 74 per acre.

The *vaingan* rice (Exp. No. 133) tested by this officer occupied 4 acres of a rice field, the whole area of which is 7 acres 27 gunthas. The field has light brown soil, with an admixture of sand and is assessed at Rs. 5-3-11 per acre. The whole field grows annually early rice, and the portion under test a second crop of hot weather irrigated rice. The irrigation water is obtained from a *nála*, which flows along the boundary of the field. Sometimes the water does not suffice, because other cultivators take for their fields situate up stream as much as they want, and what is left is taken by the field under experiment. The owner is a Kárwár pleader, who, at a cost of Rs. 2,000 to Rs. 3,000, incurred two or three years since, bunded back the salt water of the Belikeri creek. Previously the field was liable to injurious inundation by salt water. Both the rain crop and the *vaingan* rice crop are directly manured. The latter crop requires twice or at least 1½ times the quantity of manure applied to the rain crop. Each crop is grown from broadcasted seed, the hot weather crop requiring much the largest seed rate. The manure used for the tested crop consisted of cowdung dead and green forest leaves, composted together and mixed before application with paddy husk. The husk was used to keep the soil loose and open. About 5 tons per acre of the mixed manure was applied, and with it nearly 2 tons per acre of fish and ashes. The proportion of fish to ashes is not reported. It is not quite clear whether the irrigation water was sufficient this year. The season and tillage are described as good. The crop was sown in January and ripened in May. The outturn is classed at 10 to 12 annas. The yields of grain and straw are respectively, per acre, 977 lbs. and 2,417 lbs., worth Rs. 32-5-1. The incidence works out 16·23 per cent. The Collector in commenting on the test in his forwarding remarks thinks that it may safely be assumed that, if the rain crop is taken into account, the assessment does not amount to more than 8 per cent. of the gross produce. He says further that "very much of the land in Kánara has been made culturable at very great expense, and the interest on this capital as well as the heavy expenditure on manure have all to be taken into consideration, and comparison of assessment here with that of dry-crop land elsewhere, which has cost nothing to bring into cultivation, and on which the annual ploughing and sowing are the only expenses is entirely fallacious." The Collector wishes to draw special attention to the above remarks, because the Kánara settlements are coming up for revision.

Mr. C. W. M. Hudson, Assistant Collector.

This officer's rice test (No. 134) was taken in Kárwár, a táluka which, according to the report of the last experimenter, is considered by the cultivators to be highly assessed. The results of this test do not bear out the contention. The field selected for experiment is one favourably situated. It grows not only rice as a rain crop, but, at least half its area grows a second pulse crop annually. The field is situate half a mile from the sea. The soil is very sandy. It benefits from the wash of hills to the south. The assessment is Rs. 5-5-1 per acre. The rainfall of the year was sufficient, but not always seasonable. The rainfall at the end of the season no doubt was beneficial to the rabi crop. The late crop is lightly manured with ashes of burnt chaff and firewood, and the rice crop, with 160 head-loads per acre of a compost manure consisting of dry leaves, firewood ashes, stable litter, and cowdung. The rice is always grown from broadcasted seed. The seed rate reported, 229 lbs. per acre, is abnormally high. A reference on this point confirmed the seed rate as correct. The crop was sown early in June, and ripened in the 3rd week of October. It yielded per acre 2,328 lbs. grain and 2,750 lbs. straw, together worth Rs. 63-5-2. This outturn is estimated at 15 annas. The incidence works out 8·39 per cent. The expenses connected with the cultivation of the crop could not have been nearly so large as those of transplanted rice, and I think that it is certain that the balance of profit left to the occupant was considerable.

Mr. J. McNeill, Assistant Collector,

Sends one test on rice which is not satisfactory. I regret I cannot report it. The outturn figures are, I think, calculated on weighments of the undried grain produce of the test areas. The experimenter is unable to say how many days elapsed after harvest before the grain was weighed. The presumption is that it was not thoroughly dry, because the contents of a ser measure weighed 96 tolas at date of experiment and 78 tolas 5 months afterwards. The latter weight was obtained not by actually weighing the contents of a ser, but by taking half the weight of a sample which exactly filled two sers at date of experiment. There is no guarantee that the loss in weight may not have in part been due to the loss or removal of grain from the parcel during the period it was kept in Mr. McNeill's office. The loss in any case is too much to be accounted for by dryage. Assuming 96 tolas per ser to be the correct weight, the outturn of grain works out 2,550 lbs. per acre; whilst if 78 tolas per ser is right, the yield of grain is only 2,080 lbs. per acre. Mr. McNeill explains that he did not forward his experiment report with the sample at the date of his experiment, because he expected to be able to take a test on late rice and intended to send both reports together. He was prevented from making the intended experiment owing to absence on Survey duty.

J. W. MOLLISON, M.R.A.C.,
Superintendent of Farms,
Bombay Presidency.

Kirkee,
19th October 1894.

TABULAR SUMMARIES.

Summary of Crop Experiment Reports,

O. S. = Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulæ.	Average per Acre.					
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of gross Produce.
						Principal Product.	By-product.			
1	2	3	4	5	6	7	8	9	10	11
	AHMADABAD.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	Mr. G. S. Curtis, Assistant Collector.									
1	Daskrohi (Asláli) ...	Barley (Jav), 5th March 1894.	10 to 11	940 to 1,030	246	795	205	16 12 0	5 2 0 R. S.	30·59
2	Do. (Nadicha) ...	Do. (do.) 17th March 1894.	11	1,039	143	1,124	410	24 6 7	3 13 0 R. S.	15·61
3	Do. (Badodra) ...	Gram, 18th March 1894.	16	675	184	1,241	...	28 5 9	3 0 11 R. S.	10·78
	Mr. J. K. N. Kábráji, Assistant Collector.									
4	Viramgam (Odhav) ...	Wheat (Kátha), 7th March 1894.	16	825	55	631	...	16 5 3	0 14 4 R. S.	5·48
5	Do. (do.) ...	Do. (do.) ...	16	825	76	328	...	8 7 10	1 6 4 R. S.	16·44
6	Do. (Sitápur) ...	Wheat (Kátha), 11th March 1894.	14	720	49	682	...	17 10 8	1 3 2 R. S.	6·78
	Mr. Motilál Chunilál, District Deputy Collector.									
7	Sánand (Ghuma) ...	Gram, 9th February 1894.	8	320	47½	615	...	11 4 0	3 7 8 R. S.	30·92
8	Dholka (Simej) ...	Do. 20th February 1894.	10	375	10¼	1,790	...	32 11 9	2 0 0 R. S.	6·11
9	Sánand (Navápara) ...	Sugarcane (white), 13th February 1894.	16	4,060	1,125 whole canes.	7,736 gul.	16,820	901 0 6	3 6 0 R. S.	0·38

Northern Division, 1893-94.

R. S. = Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	Prices of Produce per Rupee,		Remarks.
		Principal Product.	By-product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 4	40 (weight ser)	51¼	1½	*Experiment No. 1.*—Irrigated barley, a second crop after rice, on good garden land manured for the first crop with about 6 cwts. of castor cake per acre. The field grows rice every year followed by barley, except when the moisture is insufficient for the second crop. The crop was irrigated from a well, but the extent of irrigation is unknown. Tillage good. Crop suffered a good deal from rust. Seed rate very high. Crop 8 annas according to the formulæ. Incidence on the second crop alone.
0 4	Do.	Do.	Do.	*Experiment No. 2.*—Same crop on similar land assessed at a lower rate. Field manured with 9 carts per acre of ordinary manure. Rotation undefined:—(1) *juvár*, (2) rice and barley, (3) *bájri* and barley, (4) barley; and this year *juvár* followed by barley. Season, &c., as above. Incidence on the second crop alone.
0 4	Do.	43¾	...	*Experiment No. 3.*—Gram as a sole crop on *gorâdu* soil, growing gram alone in each of the last two years, but previously rain crops. Season favourable but tillage indifferent. Seed rate 6 times that given in the formulæ and the outturn nearly double the same standard. By-product given to cattle, but not valued. Area of test below the prescribed minimum.
0 8	Do.	38⅗	...	*Experiment No. 4.*—Dry wheat, *kátha*, on unmanured black land somewhat salt. Field generally grows *vari* every year. The usual crop failed this year, and wheat was sown afterwards. Season favourable and tillage good. Crop 13 annas according to the formulæ. By-product neither valued nor weighed in this and the following two tests.
0 8	Do.	Do.	...	*Experiment No. 5.*—Same crop on black land impregnated with more salt. Field cultivated under precisely the same conditions. Season, &c., as above. Crop only 6 annas of the formulæ, though estimated at 16 annas.
0 10	Do.	Do.	...	*Experiment No. 6.*—Same crop on unmanured black land growing wheat and cotton in turn, unless the season be exceptionally unfavourable for cotton. This year cotton was spoilt by late heavy rains and wheat took its place. Season, &c., as above.
0 8	Do.	54⅔	...	*Experiment No. 7.*—Gram, a second crop after *vari*, on *kiári* land manured for the first crop with about 12 carts of cattle dung per acre. Deshi cotton and wheat grown during the previous year. Season good and tillage careful. Crop 16 annas according to the formulæ. Incidence on the second crop only.
0 8	Do.	Do.	...	*Experiment No. 8.*—Same crop on unmanured dry crop land which grew the same crop in the previous year, but previously lay fallow for four years. Sesamum had been sown early in the season, but was washed away by heavy rains, and gram substituted in its place. Seed rate very low. Season favourable; and tillage good. Outturn more than double the maximum standard of the formulæ.
0 8	Do.	9 1/10	5⅓	*Experiment No. 9.*—Sugarcane, white, on land classed as *jirâyat*, but irrigable from a well. Field left fallow last year and grew deshi cotton in the previous year. The land manured by folding goats for a month, then camels kept on it for a season; afterwards 40 carts per acre of cattle dung spread on the land, and a top-dressing of castor cake given to prevent white ants. Crop irrigated by *mot* from a well. Season good and tillage careful. Seed rate low. *Gul* valued very high in both this and the following tests.

Summary of Crop Experiment Reports,

O. S. = Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulæ.	Average per Acre,					
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of gross Produce.
						Principal Product.	By-product.			
1	2	3	4	5	6	7	8	9	10	11
	AHMADABAD—*continued.*		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	Mr. Motilál Chunilál, District Deputy Collector—continued.									
10	Dholka (Maflipar) ...	Sugarcane (black), 22nd February 1894.	4	1,250	1,330 Whole canes.	4,738 gul.	13,350	561 11 6	2 8 7 R. S.	0·45
	KAIRA.									
	Mr. J. DeC. Atkins, Assistant Collector.									
11	Thásra (Sanádra) ...	Gram, 23rd February 1894.	...	...	59	400	...	9 1 2	3 11 3 O. S.	40·81
	Mr. Sorábsha Hormasji, District Deputy Collector.									
12	Mehmadabad (Virol) ...	Spiked millet (bájri), 15th October 1893.	18	1,050	17	458	2,120 kadbi, 237 chaff.	16 6 5	3 5 4 O. S.	26·87
13	Mehmadabad (Kaira) ...	Do. (do.) 16th October 1893.	8	450	11⅓	185	1,143 kadbi, 220 chaff.	7 3 3	4 10 8 O. S.	64·79
14	Do. (do.) ...	Do. (do.) 21st October 1893.	16	900	19	621	2,117 kadbi, 337 chaff.	20 12 6	6 0 9 O. S.	29·09
	PANCH MAHÁLS.									
	Mr. E. Maconochie, Assistant Collector.									
15	Godhra (Godhra) ...	Do. (do.) 26th October 1893.	10	515	41	538	1,972	18 8 6	0 15 2 O. S.	5·11
16	Do. (Wawdi Bujrag).	Do. (do.) 31st October 1893.	10	515	23	277	1,228	10 2 10	1 1 9 O. S.	10·90

Northern Division, 1893-94—continued.

R. S. = Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	Prices of Produce per Rupee. Principal Product.	Prices of Produce per Rupee. By-product.	Remarks.
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwt.	
0 8	40 (weight ser.)	9 1/10	5 1/7	*Experiment No. 10.*—Hard black sugarcane on land classed as *jiráyat* but irrigated from a well and growing irrigated crops of wheat, chillies, brinjals and sugarcane. Field manured with 60 carts per acre of cattle dung and crop top-dressed with castor cake. Season good; and tillage fair. The yield much underestimated at 4 annas.
0 27	Do.	44	...	*Experiment No. 11.*—Unmanured and unirrigated gram on black soil growing continuous rice which was this year manured liberally. A second crop taken only when season favourable. Tillage average. Seed rate high. The anna estimate not furnished by the experimenter, but the yield represents a 10-anna crop according to the formulæ. Incidence on the second crop alone.
0 12	Do.	35 1/2	6 kadbi, 6 1/7 chaff.	*Experiment No. 12.*—*Bájri* with subordinate pulses on *goráḍu* soil manured with 9 cart-loads of farmyard manure per acre. Rotation :—*bájri* with pulses for two years followed by *bájri* and *kodra* in the third. Season favourable and tillage good. Seed rate double the average and the outturn, exclusive of the subordinate pulses which are reported to be good, represents an 8-anna crop of the formulæ.
0 12	Do.	Do.	6 kadbi, 6 1/7 chaff.	*Experiment No. 13.*—Same crop on slightly higher assessed land manured with 7 carts per acre of farmyard manure. Rotation :—*juvár* in 1890 and *bájri* with mixtures since then. Tillage bad. Yield, exclusive as above of the subordinate pulses, not more than 3 annas of the formulæ.
0 8	Do.	Do.	6 1/7 kadbi, 6 1/7 chaff.	*Experiment No. 14.*—*Bájri* alone on *goráḍu* soil manured with 9 carts of ordinary manure per acre and growing during the previous three years (1) *bájri*, (2) *bávto* and tobacco, and (3) *bájri*. Seed rate more than double the formulæ and the outturn 11 annas according to the same standard. Incidence very high.
0 10	Do.	39	3 1/7	*Experiment No. 15.*—*Bájri*, with subordinate pulses, on inferior *goráḍu* soil manured with 8 1/2 carts of ordinary manure per acre and growing *bájri* and *bávto* in alternate years. Heavy rain in June washed away the first sown seed and the land had to be sown again. The season fair; and tillage good. Outturn exclusive of the pulses which were not tested. Seed rate, though representing the quantity of two sowings, somewhat high, being double the formulæ standard (10 lbs.).
0 10	Do.	Do.	Do.	*Experiment No. 16.*—Same crop on similar soil manured in the previous year with about 7 carts of farm-yard manure per acre. No fixed rotation. Field grows *bájri*, *banti* or *bávto*. Season, &c., as above. The outturn, leaving out of consideration the subordinate pulses, less than 6 annas according to the formulæ.

Summary of Crop Experiment Reports,

O. S. = Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulæ.	Average per Acre.					
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of gross Produce.
						Principal Product	By-product.			
1	2	3	4	5	6	7	8	9	10	11
	PANCH MAHÁLS—*continued.*		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	Mr. Pránlál Harkisandás, District Deputy Collector.									
17	Dohad (Nalvai) ...	Elusine coracana (Rági or Bávto), 13th November 1893.	8	675	5	451	1,715	7 6 7	0 12 5 R. S.	10·47
18	Do. (Tuki-Vaju) ...	Do. (do.) ...	14	1,180	6¾	1,050	2,823	16 15 0	1 12 9 R. S.	10·60
19	Do. (Nádva) ...	Do. (do.) 14th November 1893.	17	1,460	6⅓	1,272	2,954	20 1 4	1 2 11 R. S.	5·88
20	Do. (Tuki Anop) ...	Do. (do.) ...	12	1,015	6	919	2,539	15 1 0	1 5 9 R. S.	9·02
21	Do. (Dohad) ...	Sesamum (Til), 1st December 1893.	8	245	25	107 Seed.	353	5 12 6	1 7 5 R. S.	25·31
22	Do. (Pusri)	Do. (do.) ...	8	245	19	111 Do.	357	5 15 10	1 9 9 R. S.	26·89
23	Do. (Kharedi) ...	Do. (do.) 3rd December 1893.	8	245	22	131 Do.	382	7 0 5	1 4 5 R. S.	18·16
	BROACH.									
	Mr. E. H. E. Leggatt, Assistant Collector.									
24	Broach (Bholáo) ...	Rice, 23rd October 1893.	13	915	51⅓	372 in husk	...	10 2 11	19 8 0 O. S.	191·51
25	Do. (Borbhátha) ...	Spiked millet (Bájri), 27th October 1893.	16	975	4	308	....	12 5 6	11 3 1 O. S.	90·67
26	Ámod (Rohodh) ...	Sesamum (Til), 13th January 1894.	16	600	¾	155 Seed.	720	14. 8 ·6	7 2 3 O. S.	49·14

Northern Division, 1893-94—continued.

R. S. = Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	Prices of Produce per Rupee.		Remarks.
		Principal Product.	By-product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwt.	
0 10	40 (weight ser)	70⅓	15¼	*Experiment No. 17.*—*Rági* on unmanured light brown, *gorádu*, soil growing only one crop in a year. Rotation undefined, *kodra* and niger seed having preceded *rági*. Season not quite favourable to the light land on which the test taken. 1½ gunthas of seed-bed stated to have furnished seedlings for an acre of field. Tillage bad. Crop not more than 5 annas of the formulæ.
0 10	Do.	Do.	12⅛	*Experiment No. 18.*—Do. on better *gorádu* soil manured with 5 carts per acre of ordinary manure. Field grew maize followed by gram during each of the last three years. Season favourable and tillage good. 1⅔ gunthas of seed-bed sufficed per acre of plantation.
0 10	Do.	Do.	13 3/16	*Experiment No. 19.*—Do. on similar land equally manured. Rotation undefined. A pulse crop raised in each of the previous three years. 1 1/16 gunthas of seed-bed gave seedlings for an acre of plantation.
0 10	Do.	Do.	11⅛	*Experiment No. 20.*—Do. on similar land. Rotation undefined, but much the same as above. Seedlings from 1½ gunthas sufficient for an acre of transplantation.
0 10	Do.	19⅓	12⅛	*Experiment No. 21.*—Sesamum on land classed as *gorádu* which lay waste for the last three years. Season unfavourable and cultivation indifferent. Seed rate very high; outturn less than 4 annas according to the formulæ standard. Incidence high.
0 10	Do.	Do.	12⅛	*Experiment No. 22.*— Do. do. do.
0 10	Do.	Do.	13⅛	*Experiment No. 23.*— Do. do. do. Last year the same crop raised after two years' fallow. Other conditions as above.
0 8	Do.	36	...	*Experiment No. 24.*—Rice in alternate rows with cotton and *tur* on heavily assessed unmanured black soil. Rotation :—(1) rice, *tur* and cotton, (2) *tur*, (3) rice and cotton, and (4) fallow. Season fair and field free from weeds. Yield actual outturn from an acre. Cotton will bear the bulk of the assessment. By-product neither weighed nor valued.
0 8	Do.	31	...	*Experiment No. 25.*—*Bájri* mixed with pulses on rich black soil growing without manure the same mixture in alternate years with *juvár*. Season fair and tillage good. The outturn is exclusive of the subordinate pulses which were not tested. By-product not weighed, but valued at Rs. 2-8-0 per acre.
0 8	Do.	11⅓	5 1/7	*Experiment No. 26.*—Sesamum on good black unmanured land growing cotton every other year in rotation with wheat or sesamum. Season, &c., as above. Crop only 4 annas according to the formulæ. The oil-seed valued very high. Incidence high, but cotton in Broach bears the greater portion of the assessment.

Summary of Crop Experiment Reports,

O. S. = Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulæ.	Average per Acre.					
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of gross Produce.
						Principal Product	By-product.			
1	2	3	4	5	6	7	8	9	10	11
	BROACH—*continued.*		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	Mr. Phirozsháh Pestanji, District Deputy Collector.									
27	Ankleshvar (Chorási) ...	Rice (Sária), 31st October 1893	18	1,750	57½	2,664 in husk	3,230	62 2 5	11 4 0 O. S.	18·10
28	Do. (Kasba) ...	Spiked millet (Bájri), 31st October 1893.	14	1,050	3	800	1,750	27 14 1	8 13 4 O. S.	31·68
29	Do. (Obha) ...	Wheat (Hánsia), 20th February 1894.	16	~~1,065~~ 775	60	844	1,056	34 1 0	4 0 5 O. S.	11·81
	SURAT.									
	Mr. W. Doderet, Assistant Collector.									
30	Balsár (Balsár) ...	Rice (Kada), 15th October 1893.	15	2,110	229	2,094 in husk	2,531	51 3 10	14 3 5 O. S.	27·74
31	Do. (Do.) ...	Do. (do.) ...	18	2,625	181	2,698 Do.	3,773	63 1 3	9 9 11 O. S.	15·25
32	Do. (Do.) ...	Do. (do.) ...	20	3,000	153	2,629 Do.	3,553	57 14 4	23 0 9 O. S.	39·80
33	Jaláipor (Mansád) ...	Sugarcane (Malbári and Vánsi mixed), 14th and 15th December 1893.	17	5,690	21,600 sets.	5,712 gul.	7,080 tops; 1,400 bundles leaves.	268 4 0	15 10 8 O. S.	5·83

Northern Division, 1893-94—continued.

R. S.—Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	Prices of Produce per Rupee.		Remarks.
		Principal Product.	By-product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 8	40 (weight ser.)	44¾	11	*Experiment No. 27.*—Rice, *Sária*, on deep black soil growing during the past three years (1) rice, *láng* and castors, (2) rice and *láng* and (3) cotton. Field manured with 19 carts of cattle dung per acre and the seed-bed, 6¼ gunthas for an acre of plantation, with 5 carts of the same manure. The crop irrigated by water deviated from a road-side channel fed by a large but shallow creek. Rain deficient at end of the monsoon, but season favourable on the whole. Cultivation excellent. Seed rate high. Outturn 1⅓ times the formulæ standard.
0 8	Do.	29½	14⅔	*Experiment No. 28.*—*Bájri* alone on good black soil manured in the previous year. *Bájri* rotated with garden crops, garlic, tobacco, sugarcane, &c. Season as above and tillage careful, though the crop damaged to some extent by birds. Seed rate very low and outturn less than 11 annas according to the formulæ. The garden crops bear the greater portion of the assessment.
0 16	Do.	27⅓	2$\frac{13}{14}$	*Experiment No. 29.*—Dry-crop wheat, *Hańsia*, on good black soil, dressed with 14 carts per acre of cattle dung. Wheat and cotton taken in turn. Season not quite favourable, the late rains being deficient. Tillage excellent. Outturn less than 14 annas of the formulæ.
0 4	37½ (weight ser.)	43	9	*Experiment No. 30.*—Unirrigated rice, *Kada*, on good black soil manured with 30 cart loads per acre of cattle dung and growing rice continuously followed by *láng* for which water is drained from a neighbouring marsh. September rain somewhat deficient, but tillage good. Area seed-bed to acre of plantation reported at 3⅓ gunthas. Seed rate very high, 30 lbs. being the formulæ standard. Incidence on the first crop alone.
0 4	Do.	45	10⅐	*Experiment No. 31.*—Same crop on similar soil, but bearing a somewhat lower assessment. Field manured with 26 cart loads per acre of cattle manure. Rice grown every year and followed by *vál* only when land sufficiently moist. Season, &c., as above. 7·4 guntha seed-bed per acre of transplantation. Seed rate lower than in the test above, but still very high.
0 4	Do.	48	10½	*Experiment No. 32.*—Same crop on very highly assessed black soil dressed very liberally with 80 cart loads of cattle dung per acre. Field grows rice followed by *vál* every year. Field irrigated from an adjoining tank and did not suffer for want of September rains as the crop in the above tests did. Cultivation good, though the field slightly weedy. Area of seed-bed per acre of plantation reported at 6 gunthas; crop 18 annas according to the formulæ. Incidence on one crop alone.
0 4	Do.	22½	6 tops, 100 bundles of leaves.	*Experiment No. 33.*—*Malbári* and *Vánsi* canes mixed on, *káli chikan*, rich black crumbling soil manured with 40 carts of cattle manure per acre and growing (1) rice, (2) rice, *vál* and castors and (3) sugarcane. *Malbári* cane was alone planted at first, but owing to neglect in watering germination was irregular. *Vánsi* cane subsequently planted to fill vacancies. Crop irrigated during the hot season twice a month from a well. Latter rains deficient which affected the crop slightly. Cultivation fair. Field not fenced and slightly damaged by jackals in consequence. Tops fed to cattle working the mill. Therefore their value Rs. 10-8-0 excluded from column 11.

Summary of Crop Experiment Reports,

O. S.=Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulæ.	Average per Acre.					
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of gross Produce.
						Principal Product.	By-product.			
1	2	3	4	5	6	7	8	9	10	11
	SURAT—*continued.*		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	Mr. Anna Gopál Kotvál, District Deputy Collector.									
34	Olpád (Olpád)... ...	Rice (Sáliu), 15th October 1893.	20	1,800	76	2,392 in husk	3,100	57 2 5	8 5 5 O. S.	14·59
35	Do. (Bhesán) ...	Do. (Kada), 21st October 1893.	20	1,800	68	3,586 in husk	4,850	79 1 8	14 8 6 O. S.	18·37
36	Do. (Sáyan) ...	Do. (Mánjarvel), 13th November 1893.	20	1,800	67	3,144 in husk	6,190	77 4 7	11 12 4 O. S.	15·23
	Mr. J. W. Mollison, Superintendent of Farms.									
37	Chorási (Kumbhárya)..	Potatoes (Tarabdi albi), 23rd February 1894.	15	9,140	788	7,513	...	141 6 3	17 8 0 O. S.	12·37
	THÁNA.									
	Mr. L. G. Deshmukh, Assistant Collector.									
38	Sháhápur (Kasára) ...	Elusine coracana (Rági), 2nd November 1893.	10	620	3	351	...	7 4 0	0 3 1 O. S.	2·65
39	Kalyán (Gerse) ...	Gram, 20th February 1894.	20	500	48	564	...	15 8 0	0 3 4 O. S.	1·34
40	Sháhápur (Cherpoli) ...	Do. 27th February 1894.	16	400	44	391	...	10 12 0	4 2 6 O. S.	38·73
	Mr. C. W. M. Hudson, Assistant Collector.									
41	Dáhánu (Káse) ...	Do. 28th February 1894.	12	250	56	867	...	31 14 6	1 9 3 O. S.	4·94

Northern Division, 1893-94—continued.

R. S.=Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	Prices of Produce per Rupee.		Remarks.
		Principal Product.	By-product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwt.	
0 4	37 (weight ser.)	44 4/13	8 4/7	*Experiment No. 34.*—Rice, *Sáliu*, on black, *chipat*, soil manured with 11 maunds (3 4/9 cwts.) of castor cake per acre. Field grows rice always followed or not by a second crop of *val* and castors as the season is favourable or otherwise. Seedlings from 4 gunthas covered an acre of plantation. Season favourable and tillage good. Seed rate high. The outturn 600 lbs. over the maximum crop of the formulæ.
0 4	Do.	48 1/3	8 13/14	*Experiment No. 35.*—Rice, *Kada*, every year on superior black soil manured with 30 carts of cattle dung per acre. Crop irrigated 7 times from an adjacent tank. Season, &c., as above. Seedings from 4-8 gunthas required for an acre of field. Seed rate high. Yield double the formulæ standard. It is probable that a second crop might be taken occasionally on this field.
0 4	Do.	44 4/13	8 4/7	*Experiment No. 36.*—Rice, *Manjarvel*, on similar soil but without any irrigation facilities. Field manured with 40 loads of cattle dung per acre. Rice taken every year with or without a second crop of castor or *val* as the season permits. Season, &c., as above. Yield 1 3/4 times the maximum crop of the formulæ.
0 4·117	Do.	53 1/8	...	*Experiment No. 37.*—Indigenous potatoes, *tarabdi albi*, a very small red variety, on rich *gorádu* garden land taken as a second crop after ginger which was manured with about 35 tons per acre of compost of night-soil, sweepings and rubbish. Rotation :—(1) ginger with chillies on borders of beds, (2) brinjals and (3) ginger and potatoes in the current year. Crop watered 9 times at an interval of 8 to 10 days from a well by means of 2 *mots*. Season and tillage both good. Seed rate low due to the very small size of the seed used. Yield compared to the formulæ 12 annas. Incidence on the second crop alone.
0 10	59	48 3/5	...	*Experiment No. 38.*—Red *nagli* on unmanured *murmád* land that lay fallow for two years and grew black gram in the year before the tested crop. Season unfavourable, rain being excessive at commencement and insufficient afterwards. Cultivation indifferent. Area of seed-bed reported at 1/4 acre for an acre of field, very high. Seed rate less than half the formulæ rate and the yield only 7 annas according to the same standard. By-product not valued.
0 8	71	36 2/5	...	*Experiment No. 39.*—Gram every year on unmanured rabi land in which moisture is kept by impounding rain water in the monsoon. Season favourable; and tillage good. Crop full maximum. By-product not valued.
0 8	Do.	Do.	...	*Experiment No. 40.*—Gram, an after crop, on good rice land growing rice always followed by a second crop when season allows. Season favourable; and tillage good. Sample ser in this instance not forwarded to this office. Incidence on the second crop alone.
0 4	75 11/16	27 1/8	...	*Experiment No. 41.*—Gram as a second crop after rice on kharif land retentive of moisture and growing the pulse after rice in each of the last two years. Season average and cultivation good. Seed rate about average. Yield 1 1/4 times that for the maximum standard of the formulæ. The pulse valued rather high; and the by-product, though admittedly an useful fodder for cattle, not valued. Test area below the prescribed minimum.

Summary of Crop Experiment Reports,

O. S.=Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulæ.	Average per Acre.					
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of gross Produce.
						Principal Product	By-product.			
1	2	3	4	5	6	7	8	9	10	11
	THA'NA—*continued.*		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	Mr. V. R. Patvardhan, District Deputy Collector.									
42	Váda (Gátes)	Gram, 17th February 1894.	16	425	86	775	...	27 0 0	2 10 8 O. S.	9·87
43	Do. (Váda)	Do. 19th February 1894.	20	500	88	1,152	...	39 0 0	3 3 11 O. S.	8·32
44	Máhim (Yedvan) ...	Sugarcane (blackish red), 2nd March 1894.	16	4,000	22,800	8,422 gul, 1,067 kákvi.	8,055 tops.	646 3 6	4 7 9 O. S.	0·69

Northern Division, 1893-94—concluded.

R. S.=Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	Prices of Produce per Rupee.		Remarks.
		Principal Product.	By-product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwt.	
0 10	70	28⅔	...	*Experiment No. 42.*—Gram on middling black kharif land incapable of growing any crop during the monsoon because water stagnates on it. Season favourable though rain at end of December did some slight damage, the crop being in flower at the time. Tillage careful. Crop 1½ times the maximum standard of the formulæ. By-product, useful for ráb purposes, not valued. High seed rate accounted for by its being broadcasted and not drilled.
0 10	72	29½	...	*Experiment No. 43.*—Gram on darkest brown, *chikanvat*, soil, growing rice every year and a second crop of gram only occasionally. Season very favourable; and tillage good. Outturn more than double the maximum of the formulæ.
0 4	28 (weight ser.)	14⅓ gul, 23 kákvi.	5⅓	*Experiment No. 44.*—Sugarcane on black *bágáyat* land, *válvanti mordi*, growing rice for two years and sugarcane in the third. Crop manured with castor cake applied in three top dressings at an interval of a month between each, the first one two months after planting. Crop watered from a well five times before the rains and once a week from October to March. Tillage careful. Crop 10 months old at the time of cutting. *Kákvi* or molasses made from immature shoots.

Summary of Crop Experiment Reports,

O. S. = Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulæ.	Average per Acre.					
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of gross Produce.
						Principal Product	By-product.			
1	2	3	4	5	6	7	8	9	10	11
	KHANDESH.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p	Rs. a. p	Per cent.
	Mr. C. G. Dodgson, Assistant Collector.									
45	Nandurbár (Ghotáne) .	Spiked millet (Bájri), 18th November 1893.	7	130	11	140	231 straw, 19 chaff.	4 1 6	0 6 0 O.S.	9·16
46	Do. (do) ...	Do. (do.) ..	12	400	14	357	484 straw, 49 chaff.	8 13 8	0 7 4 O.S.	5·18
	Mr. C. N. Seddon, Assistant Collector.									
47	Sindkheda (Varsi) ...	Wheat (Bansi), 31st January 1894.	12	500	75	564	248	15 7 8	2 10 8 R.S.	17·23
48	Do. (do.) ...	Linseed, 21st February 1894.	10	155	12½	377 seed.	...	19 12 0	2 11 3 R.S.	13·68
49	Bhusával (Bhusával) .	Wheat (Nim-Bansi), February 1894.	14	910	129	992	350	35 12 6	4 9 10 R.S.	12·8
	Mr. P. R. Cadell, Assistant Collector.									
50	Bhusával (Sátáre) ...	Linseed (Javas), 30th January 1894.	16	400	15	306 seed.	180	16 15 1	3 10 4 R.S.	21·52
51	Do. (do.) ...	Wheat (Pote Lál Káthe), 30th January 1894.	13 to 14	590 to 670	53⅓	449	580	19 12 10	3 8 2 R.S.	17·73
	Mr. S. B. Chitgubi, District Deputy Collector.									
52	Páchora (Páchora) ...	Do. (Bansi), 20th February 1894.	12	500	125	721	992	32 15 0	2 0 0 R.S.	6·07

Central Division, 1893-94.

R. S. = Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	Prices of Produce per Rupee.		Remarks.
		Principal Product.	By-product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 9	140	57½	1¼ straw, 1/16 chaff.	*Experiment No. 45.*—*Bájri* on gravelly *barad* land growing always the same crop. No manure applied. Heavy early rain delayed sowing until September. Tillage indifferent and crop poor. By-product valued very high.
0 11	144	52½	3¼ straw, ⅛ chaff.	*Experiment No. 46.*—*Bájri* continuous on *kankráli* unmanured soil of nearly the same class as above. Season, &c., same. Seed rate high. Tillage good and the outturn better.
0 20	142½	39	2 1/16	*Experiment No. 47.*—Dry-crop wheat, *bansi*, on good black soil growing usually wheat, cotton, and linseed in turn. Season only fair owing to absence of rain for sowing in October and its failure after November. Cultivation indifferent. Seed rate high.
0 10	120	19	...	*Experiment No. 48.*—Linseed on similar soil and growing the same crops in rotation. Season, &c., as above. Seed-bolls only partially filled owing to absence of later rains. Crop 15 annas according to the formulæ standard.
0 8	141	39	1/16	*Experiment No. 49.*—Irrigated wheat, *nim-bansi*, on good black soil. Area under wheat grew cotton last year and was then manured with about 5 carts of cow-dung, nightsoil and household refuse per acre. The rest of the field this year under onion, garlic, tabacco, and other garden crops. Crop irrigated 4 times from a well at an interval of a fortnight between each watering. Season fair; tillage good. Seed rate high.
0 10	120	18½	4/7	*Experiment No. 50.*—Linseed on black soil which is usually not manured, but is favourably situated near a town. Rotation undefined:—(1) wheat, (2) linseed, (3) cotton, and (4) wheat. Season quite favourable to the crop, but tillage indifferent. Outturn only 13 annas according to the formulæ. The incidence of assessment somewhat high. The test crop is one in rotation with cotton which perhaps bears the chief part of the assessment.
0 8	141	27¾	1/7	*Experiment No. 51.*—Dry-crop wheat, *kàthe*, on similar land manured with 5 or 6 carts of cow-dung spread over different portions of the field every year. Rotation:—wheat alternates with cotton. Season rather dry at sowing and later rain in November untimely. Tillage not careful. Crop less than 12 annas. High incidence for reasons given above.
0 15	136	32	4/7	*Experiment No. 52.*—Yellow wheat, *bansi*, on black *khàrvat* soil liberally manured with 20 carts of cotton refuse per acre and growing cotton, *jowári*, *mug*, tobacco and other garden crops in various parts of the field. Season fair and tillage good. Seed rate high, being 4 times the formulæ standard. Crop tested in two patches and the results wrongly shown as two separate experiments; average of the two shown here. Experimenter forwarded two sample sers, of which one weighed in this office 3½ tolas short of the recorded weight. By-product valued very high. Crop 15 annas according to the formulæ.

Summary of Crop Experiment Reports,

O. S. = Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulæ.	Average per Acre.					
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of gross Produce.
						Principal Product	By-product.			
1	2	3	4	5	6	7	8	9	10	11
	KHA'NDESH—*contd.*		Annas	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	Mr. Kázi Kamruddin, District Deputy Collector.									
53	Dhulia (Valvádi) ...	Spiked millet (Bájri), 30th October 1893.	16	640	10½	631	540 bundles.	20 9 7	1 9 0 O. S.	7·58
54	Amalner (Amalner) ...	Wheat (Bansi), 3rd February 1894.	16	800	7.5	749	886	24 0 0	2 7 9 R. S.	10·35
	NA'SIK.									
	Mr. R. B. Stewart, Assistant Collector.									
55	Málegaon (Dábhádi) ...	Great millet (Jowári), 4th December 1893.	14	605	7½	341	480	11 7 8	1 1 6 R. S.	9·52
	Mr. K. M. Thatte, District Deputy Collector.									
56	Násik (Deolálí) ...	Gram, 11th February 1894.	10	205	47	460	271	11 6 5	2 4 5 R. S.	19·06
	Mr. G. H. Hampton, Assistant Superintendent, Deccan Revenue Survey.									
57	Chándor (Dugaon) ...	Groundnut, 25th November 1893.	20	4,000	50	3,610 fresh-nuts.	6,302	122 0 0	5 13 6 R. S.	4·79
58	Do. do. ...	Do. 26th November 1893.	20	4,000	50	3,938 Do.	6,302	132 0 0	2 12 6 R. S.	2·10
59	Do. do. ...	Do. 27th November 1893.	18	3,600	50	1,559 Do.	4,000	57 8 0	0 3 0 R. S.	0·32
60	Yeola (Nágaon) ...	Sugarcane (Pundia), 18th December 1893.	16 to 18	...	...	Number of canes—16,032 large, 7,440 medium, 7,552 small 31,024	...	1,102 0 0	1 7 7 R. S.	0·13

Central Division, 1893-94—continued.

R. S. = Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	Prices of Produce per Rupee.		Remarks.
		Principal Product.	By-product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 10	162	41½	100 bundles.	*Experiment No. 53.*—*Bájri* on fairly good black soil, not manured for the last four years. *Jowári* and cotton grown this year on other parts of the field. Rotation undefined. The previous crops were :—cotton in 1891 and *bájri* and *math* in 1892. Season favourable; and tillage fair. Sample of grain forwarded to this office weighed 155¾ tolas only.
0 10	146	37½	2	*Experiment No. 54.*—Dry-crop wheat on fairly good black soil, which did not receive any manure for the past three years and grew during that period (1) *bájri*, (2) cotton and (3) *jowári*, cotton and *tur*. Season favourable; tillage good. Seed rate very high.
0 8	147½	51	⅘	*Experiment No. 55.*—Kharif *jowári* on unmanured middling black soil growing linseed and *jowári* alternately. Season fair, but the crop suffered somewhat from deficiency of late rain. Cultivation fair. By-product valued very high. Crop only 11 annas according to the formulæ.
0 10	115	44½	2⅝	*Experiment No. 56.*—Unmanured and unirrigated gram taken as a sole crop on good blackish soil growing wheat and gram in alternate years. Season fair, the crop suffering from deficient rains. Tillage not good. Seed rate high. Crop 15 annas according to the formulæ. Incidence somewhat high. The land apparently capable of being double cropped, but only one raised during the year.
0 5	80 (weight ser).	32½	4½	*Experiment No. 57.*—Groundnut on the *bágáyat* portion of a good black soil field, dressed with 25 to 30 carts of cattle manure and growing *bájri*, and *bhuimug* in alternate years. A second crop of wheat or gram taken after *bájri*, if sufficient water available. Well as also channel irrigation used to water the crop, but its extent is not reported. Season favourable and tillage good. Figure in column 7 shows the weight of fresh nuts, whilst the formulæ estimate in column 5 is for dry nuts. The same remarks apply to the next two tests. Both the principal and the by-product valued high.
0 5	Do.	Do.	Do.	*Experiment No. 58.*—Same crop on mixed black soil grown under like conditions, but with a heavier dressing of manure, 30 to 35 carts per acre. Other remarks as above.
	Do.	Do.	3½	*Experiment No. 59.*—Same crop on mixed black soil with a considerable proportion of lime. Field lightly manured with 4 to 5 loads per acre of cattle-dung. Crop irrigated from two old wells which were only partially filled, owing to scanty rainfall, and the outturn low in consequence. The land grows *bájri* principally, followed by wheat, earthnuts, onions, &c., in small patches. Water rate evidently not included in the assessment shown in column 10.
0 2·5	...	21¼ large, 32 medium, 64 small, canes.	...	*Experiment No. 60.*—Sugarcane, *pundia*, on black soil manured with twenty carts of cattle-dung per acre before sowing. Field usually grows wheat with *bájri* followed by gram at intervals. Crop irrigated from a well. Extent of watering not given, but stated to be not liberal. The crop was not turned into *gul* as usual, and therefore entry in column 7 simply shows the number of canes per acre. Produce valued at retail rates which ruled very high. Sets for planting cost Rs. 22 per acre. Area of test below minimum due to owner's unwillingness to cut more crop, owing to difficulty in selling it off during a day.

Summary of Crop Experiment Reports,

O. S. = Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulæ.	Average per Acre.					
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of gross Produce.
						Principal Product.	By-product.			
1	2	3	4	5	6	7	8	9	10	11
	AHMADNAGAR.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	Mr. M. C. Gibb, Assistant Collector.									
61	Nagar (Sárole Kásár) .	Great millet (Jowári), 20th January 1894.	13	710	8	420	417 bundles.	13 9 1	0 12 5 R. S.	5·72
62	Sangamner (Loni) ...	Hard red wheat (Káthe), 6th February 1894.	11	350	20	479	...	12 6 0	1 1 8 R. S.	8·92
	Mr. Sorábji Padamji, Assistant Collector.									
63	Párner (Dhotre B.) ...	Spiked millet (Bájri), 18th November 1893.	8	160	9¼	677	1,860 straw, 200 chaff.	20 5 10	0 5 6 R. S.	1·68
64	Karjat (Bhámbore) ...	Great millet (Shrikhandi Jowári) and	12	500	8	615	2,475	13 8 0	0 11 5 R. S.	4·83
		Safflower (Kardai), 19th January 1894.	12	65	1¼	66	...	1 4 0		
								14 12 0		
65	Do. (Karjat) ...	Great millet (Dagdi Jowári) and	10	280	5	447	1,960	12 13 0	0 7 6 R. S.	3·71
		Safflower (Kardai), 31st January 1894.	10	60	1¼	174	...	3 12 11		
								16 9 11		
	Mr. V. B. Vádekar, District Deputy Collector.									
66	Kopargaon (Puntámbe).	Spiked millet (Bájri), 23rd November 1893.	16	560	6	532	1,192 straw, 149 chaff.	17 9 4	1 0 0 R. S.	5·68
67	Do. (do.) ...	Do. (do.) 24th November 1893.	14	470	6	438	776 straw, 113 chaff.	14 11 8	0 13 8 R. S.	5·79
	POONA.									
	Mr. H. W. J. Bagnell, Assistant Collector.									
68	Haveli (Parvati) ...	Do. (do.) 2nd November 1893.	16	640	14	906	3,476	29 15 3	1 15 5 R. S.	6·55

Central Division, 1893-94—continued.

R. S.=Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	Prices of Produce per Rupee.		Remarks.
		Principal Product.	By-product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 12	100	41	125 bundles.	*Experiment No. 61.—Jowári* with *kardai* on unmanured black soil. Rotation undefined :—(1) *jowári*, (2) *jowári* and (3) *bájri* with subordinate mixtures in each case. Season fair; but the cultivation bad. The subordinate crop occupying about ¼ area remained untested. The outturn less than 11 annas according to the formulæ.
0 10	110	39½	...	*Experiment No. 62.*—Wheat, *káthe*, with a sprinkling of safflower on black soil, growing the same crop every year. Season not favourable, but tillage good. Seed rate low. By-product valued at 4 annas per acre, but not weighed. The sample ser weighed in this office 107¼ tolas only.
0 8	120	37	21⅛ straw, 1⅛ chaff.	*Experiment No. 63.—Bájri* on *khalgat, i.e.*, shallow black soil with an underlayer of light coloured earth. Field manured with 3½ cart-loads of cow-dung per acre. Rotation :—(1) *bájri* and wheat, (2) *bájri, tur* and *math*, and (3) *bájri, tur, math* and gram. Rain somewhat deficient. First sowing failed. Cultivation good. Crop 17 annas according to the formulæ though estimated at 8 annas only.
0 8	109	56	8⅛	*Experiment No. 64.*—Late *jowári* and *kardai* in rows (5:1) on black soil, growing the same crop every year without any manure. Rainfall scanty, and the crop damaged by cloudy weather in December. Tillage good. Crop 15 annas according to the formulæ. By-product valued very low.
	86	53	...	
0 8	109	44¾	6¼	*Experiment No. 65.*—Same crop every year also on black soil. Proportion of *jowári* to *kardai* reported 10:3, but probably 3:1. Season, &c., as above Tillage indifferent. Crop 12 annas of the formulæ.
	85	45¾	...	
0 8	122	37½	3⅛ straw, 3 3/16 chaff.	*Experiment No. 66.—Bájri* on light black soil dressed with 10 carts per acre of cattle manure. Field grows the same crop every year and occasionally a second crop of gram when season permits. The crop suffered from a long break in August, and the outturn reduced to average. Tillage fair. Sample of grain received in this office weighed 119½ tolas.
0 8	Do.	Do.	2⅛ straw, 3 3/16 chaff.	*Experiment No. 67.*—The same crop grown continuously on soil of similar class but assessed lower. Field manured with half the above quantity per acre. Season, &c., as above. Sample weighed 4½ tolas short in this office.
0 8	93	33⅓	11	*Experiment No. 68.—Bájri* on fairly good soil, partly black and partly *bhurkhad*, varying in depth from 8 to 24 inches. Rotation :—(1) groundnut, (2) *bájri* and gram (irrigated), and (3) do. Rain not quite seasonable; but cultivation good. Yield more than bumper according to the formulæ.

Summary of Crop Experiment Reports,

O. S. = Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulæ.	Average per Acre.					
					Seed.	Yield of.		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of gross Produce.
						Principal Product.	By-product.			
1	2	3	4	5	6	7	8	9	10	11
	POONA—*continued.*		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	Mr. H. W. J. Bagnell, Assistant Collector—continued.									
69	Mával (Vadgaon) ...	Eleusine Coracana (Late Nágli) 25th November 1893.	15	1,110	16	550	630	15 7 6	0 9 6 R.S.	3·84
70	Do. do. ...	Rice (Ambemohor), 25th November 1893.	20	3,000	50	2,326 in husk	3,360	58 7 0	2 9 3 R.S.	4·41
	Mr. T. D. Fry, Assistant Collector.									
71	Indápur (Bhigvan) ...	Great millet (Mál-dándi Jowári) with	11	475	7½	276	1,345 kadbi, 75 chaff.	9 8 9	0 11 2 R.S.	6·43
		Safflower (Kardai), 18th January 1894.	16	80	2	54	...	1 4 10		
								10 13 7		
72	Do. do. ...	Gram with Safflower.	5	50	...	139	202	3 12 0	0 11 2 R.S.	13·81
		(Kardai), 18th January 1894.	16	80	2	54	...	1 4 10		
								5 0 10		
73	Do. (Loni) ...	Great millet (Mál-dándi Jowári) with	13	725	5½	651	2,200 kadbi, 60 chaff.	16 2 2	0 13 2 R.S.	4·54
		Safflower (Kardai), 25th January 1894.	20	100	1	94	...	2 0 0		
	Mr. F. B. Young, Divisional Inspector, L. R. and Agriculture, C. D.							18 2 2		
74	Purandhar (Sásvad) ...	Spelt wheat (Khapli or Jod), 13th February 1894.	18	1,620	86	2,289 husked	2,160 bundles.	95 5 6	3 4 1 R.S.	3·41
75	Do. do. ...	Groundnut, 15th February 1894.	16	3,200	51½	2,755 in shell	...	833·9	5 1 1 R.S.	6·09

Central Division, 1893-94—continued.

R. S. = Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	Prices of Produce per Rupee.		Remarks.
		Principal Product.	By-Product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 8	79½	36⅔	12	*Experiment No. 69.—Nágli, garvi* or late, on reddish *ma'l varkas* land growing (1) *nágli*, (2) *jowári*, and (3) *til*, after three years' fallow. Seed-bed manured at the rate of 20 carts of cow-dung and grass per acre, but its proportionate area per acre of plantation not given. Rain at end of October deficient, and reduced the outturn to 11 annas. Tillage good. Seed rate high. Sample of grain not received in this office.
0 4	81	41½	12	*Experiment No. 70.*—Planted rice, *ambemohor*, continuously on *gaddi* or rice land, on which no second crop is raised owing to excess of moisture. 12 gunthas of seed-bed, rábed with 12 carts of cow-dung and grass, apparently furnished seedlings for an acre of plantation. Season on the whole fair; and the crop full average though estimated at the bumper standard. Seed rate high. Grain sample not received.
0 8	88	45⅛	3 9/14 kadbi, 2 9/7 chaff.	*Experiment No. 71.—Jowári* and *kardai* in rows (7:1) on medium black, *gundal*, soil, sparingly manured with ¼ cart of cow-dung per acre, and growing the same crop every year. Gram substituted annually, however, for *jowári* in portions of the field. Season somewhat unfavourable owing to deficiency of November rain. Tillage careful. Outturn of *jowári* not more than 8 annas according to the formulæ. Subordinate crop not quite ready for cutting at the time of the experiment, and the results from the following test made applicable here, the conditions in both being identical.
	68	41⅘	...	
0 8	94	33	11 9/14	*Experiment No. 72.*—Gram with the same subordinate crop on another part of the above field. Conditions same as above. Outturn of gram 9 annas according to the formulæ. Seed rate for gram unknown.
	68	41⅘	...	
0 8	94	50⅔	6⅔ kadbi, 3⅔ chaff.	*Experiment No. 73.—Jowári and kardai* in rows (7:1) on unmanured light black soil, *nim káli*, growing the same crop every year. Season, &c., as above. Samples of *jowári* and *kardai* weighed in this office 3⅓ and 2⅔ tolas, respectively, short of the recorded weights.
	73	46⅘	...	
0 4	96	27	200 bundles.	*Experiment No. 74.*—Wheat, *khapli*, on good black soil manured with about 18 carts per acre of ordinary manure and irrigated from a well in the field and from a channel, supply from which, however, is ordinarily available only till the end of November. Rotation undefined:—*jowári* with or without *kardai* having been grown during the past two years. Season favourable and tillage good. Yield more than bumper according to the formulæ. *Khapli* straw, not ordinarily used as fodder, valued rather high,—Rs. 10-12-9 per acre.
0 4	76 (weight ser.)	33⅓	...	*Experiment No. 75.*—Groundnut on similar soil irrigable from a well and from a pát. The latter supply lasts till February. The field was manured with 16 cart-loads per acre of ordinary manure, and grows potato, garlic, spelt wheat and other like garden crops without any regular rotation. Season, &c., as above. Crop 14 annas according to the formulæ. By-product, useful as good fodder, not valued.

Summary of Crop Experiment Reports,

O. S. = Original Survey ;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulæ.	Average per Acre.					
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of gross Produce.
						Principal Product	By-product.			
1	2	3	4	5	6	7	8	9	10	11
	POONA—*continued.*		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	Mr. J. W. Mollison, Superintendent of Farms.									
76	Haveli (Hadapsar) ..	Red onions (Kánda) 7th May 1894.	17	8,500	19½	26,974	...	147 8 2	1 4 9 R.S.	0·88
77	Do. (Mánjri B.) ...	Sugar-cane (Pundia), 27th February 1894.	14	...	about 18,000 sets.	71,320 canes.	9,930 tops.	558 12 0	1 4 9 R.S.	0·23
	SHOLÁPUR.									
	Mr. R. C. Brown, Assistant Collector.									
78	Karmále (Pánde) ...	Gram, 30th January 1894.	14	405	40	606	...	16 5 10	0 13 7 R.S.	5·18
79	Do. do. ..	Linseed (Javas), 30th January 1894.	10	155	25	160 seed.	...	8 7 0	0 12 0 R. S.	8·88
	Mr. G. Scott, District Deputy Collector.									
80	Pandharpur (Shegaon).	Gram, 25th January 1894.	12	300	38	352	...	7 11 4	0 5 4 R.S.	4·32
81	Málsiras (Velápur) ..	Do. 29th January 1894.	8	120	30	398	...	8 12 0	0 4 5 R.S.	3·15
	Mr. F. B. Young, Divisional Inspector, L. R. and Agriculture, C. D.									
82	Pandharpur (Pandharpur).	Great millet (Máldándi and Gudadi Jowári), 24th January 1894.	12	700	10½	477	2,250 kadbi, 80 chaff.	19 3 3	1 0 11 R.S.	5·50

Central Division, 1893-94—continued.

R. S. = Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	Prices of Produce per Rupee.		Remarks.
		Principal Product.	By-product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 2·73	76 (Weight ser.)	183	...	*Experiment No. 76.*—Red onions on by far the best portion of mixed black field manured with 36 carts per acre of farm-yard manure before sowing and growing chillies and fodder *jowári* during the last two years. About 7 carts of the same manure again used as top-dressing after transplantation. Season good ; and tillage careful. Crop irrigated 12 times from a well at an interval of 7 or 8 days between each watering. Seed rate, compared to the formulæ, (3 lbs. per acre), very high and the outturn over 3 times the same standard.
0 4	...	...	...	*Experiment No. 77.*—Sugar-cane, *pundia*, on medium black soil growing :—(1) capsicum and (2) maize during the previous two years. Land heavily dressed with 25 tons of farm yard manure per acre before sowing and a top-dressing of 2,400 lbs. per acre of fish manure applied when crop was 6 months planted. Crop irrigated 24 times from the Khadakvásla canal. Figure in column 7 gives the weight of canes ; the produce was not, as usual, turned into *gul*, but purchased standing to furnish sets for planting. Column 9 includes Rs. 58-12-0, the cost of cutting and stripping the cane and forming sets. Stripped leaves left on the field according to agreement. One acre of cane was found sufficient to give sets for planting 11 acres.
0 8	131½	37	...	*Experiment No. 78.*—Gram on good black soil, *mulshi*, growing in alternate years *jowári* and gram each with rows of *kardai*. Safflower not tested and proportionate area unknown. Rain somewhat excessive for gram. No manure applied. Tillage indifferent. Seed rate high. The crop, estimated at 14 annas only, yielded a bumper outturn according to the formulæ.
0 8	123	18 9/10	...	*Experiment No. 79.*—Linseed on black, *chopan*, soil growing *jowári* year after year. This year the cultivator being unable to sow *jowári* put in linseed instead. Season good ; tillage indifferent. Seed rate double the formulæ (12 lbs.). The sample of oilseed weighed 120½ tolas only.
0 8	148 5/8	45⅔	...	*Experiment No. 80.*—Gram on inferior black, *chikan*, unmanured soil, growing *jowári* for 3 years followed by gram in the 4th. Season fairly good ; but tillage indifferent. The sample received in this office weighed 140 tolas only and is reported by the experimenter to have been weighed when rather wet. By-product neither valued nor weighed. Pulse valued rather low in both this and the following tests.
0 8	147½	45¼	...	*Experiment No. 81.*—Same crop on black, *marul*, soil irrigable from a well built since revision settlement. Rotation :—(1) *bájri*, (2) gram and (3) *jowári*. Season and tillage as above. Crop watered once in December. Outturn better than in the above test and represents a 14-anna crop according to the formulæ.
0 8	143	44	2½ kadbi, 2 1/7 chaff.	*Experiment No. 82.*—Rabi *jowári, máldándi and gudadi*, yellow and white, on unmanured mixed black soil growing *jowári* and gram during the previous two years. Rain in November deficient but season on the whole favourable. Tillage good. Crop only 10 annas according to the formulæ. Sample ser weighed 4 tolas short in this office.

Summary of Crop Experiment Reports,

O. S. = Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulæ.	Average per Acre.					
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of gross Produce.
						Principal Product	By-product.			
1	2	3	4	5	6	7	8	9	10	11
	SHOLA'PUR—*continued.* *Mr. F. B. Young, Divisional Inspector, L. R. and Agriculture, C. D.*—continued.		Annas.	Lbs.	Lbs	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
83	Pandharpur (Shegaon).	Gram, 27th January 1894.	16	480	24½	788	600 chaff.	21 3 2	1 1 11 R.S.	5·28
	SA'TA'RA. *Mr. W. C. Rand, Assistant Collector.*									
84	Koregaon (Koregaon).	Great millet (Argadi Jowári), 21st November 1893.	14	940	12	302	2,252	15 7 6	0 15 10 R.S.	6·41
85	Vái (Vái)	Gram, 23rd January 1894.	16	560	64	438	...	13 11 10	4 0 11 R.S.	29·53
86	Do. do.	Do. ..	18	630	58	540	...	16 8 1	4 1 4 R.S.	24·74
	Mr. S. R. Arthur, Assistant Collector.									
87	Karád (Umraj) ...	Sugar-cane (Pundia), 10th April 1894.	10	1,860	1,400 canes.	4,227 gul.	16,805 tops.	260 11 2	1 14 6 O.S.	0·73
	Mr. R. J. C. Lord, Assistant Collector.									
88	Pátan (Malhárpeth) ...	Great millet (Jowári), 16th February 1894.	12	600	10¾	1,268	2,938	36 15 0	2 9 0 O.S.	6·93
	Mr. J. M. Cursetji, District Deputy Collector.									
89	Mán (Bidál)	Sugar-cane (Pundia), 5th April 1894.	12	3,000	2,720 canes.	8,998 gul.	12,373 tops, 8,045 leaves.	379 10 0	5 10 0 R.S.	1·48

Central Division, 1893-94—concluded.

R. S. = Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	Prices of Produce per Rupee.		Remarks.
		Principal Product.	By-product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 8	143	42	$2\frac{1}{7}$	*Experiment No. 83.*—Gram on black soil growing every year *jowâri*, *kardai* and gram in different parts of the field. Crop not manured. Season favourable; and tillage good. Crop more than full maximum according to the formulæ.
0 8	$116\frac{1}{4}$	$32\frac{3}{4}$	$3\frac{1}{3}$	*Experiment No. 84.*—Kharif *jowâri* on reddish black, *mâl*, land, growing during the previous three years (1) *bâjri* with pulses and (2) and (3) *jowâri* with green gram. Season and tillage both fair. No manure applied. Seed rate double the formulæ standard; grain eaten by birds. The outturn is independent of green gram which occupied every 6th row. The sample received in this office weighed $4\frac{1}{2}$ tolas short of the reported weight.
0 8	113	$31\frac{9}{10}$	...	*Experiment No. 85.*—Gram taken as a second crop after *udid*, black gram, on good black soil manured for the rain crop with about 8 carts of cow-dung per acre. The crops grown in the previous two years were:—(1) *bâjri* and (2) kharif *jowâri*. Rain in October somewhat deficient. Seed rate very high. Tillage good. Incidence on the 2nd crop alone.
0 8	116	$32\frac{3}{4}$	...	*Experiment No. 86.*—Same crop with a sprinkling of safflower, and linseed on similar land manured for the first crop with about 2 carts per acre of the ordinary manure. Rotation:—(1) *bâjri* and *pâvta*, (2) and (3) *jowâri* and wheat. Season, &c., as above. The outturn exclusive of the sprinklings which were untested. Incidence as above on the 2nd crop alone.
0 4	78 (weight ser.)	$20\frac{4}{5}$	$2\frac{4}{7}$	*Experiment No. 87.*—Sugarcane, *pundia*, on a field the soil of which varies considerably. Sugarcane, *jowâri* and groundnut grown in successive years. Field manured with 15 carts of cow-dung and heavily folded with sheep. Crop irrigated once a week from a well built since settlement. Cultivation good.
0 8	121	$40\frac{1}{3}$	$4\frac{6}{7}$	*Experiment No. 88.*—Late *jowâri* taken as a second crop on black soil manured with 8 carts of cow-dung per acre before the sowing of the first crop of maize and black gram. Rotation:—(1) maize and *jowâri*, (2) groundnut and (3) *jowâri*. Season favourable and cultivation good. Outturn, exclusive of the subordinate crops, gram and safflower, which were almost failures, full maximum though estimated at 12 annas only. The sample ser received in this office weighed $111\frac{1}{4}$ tolas only, and it is doubtful whether the experimenter allowed the grain to dry thoroughly before weighment. Figures therefore untrustworthy.
0 5	80 (weight ser.)	$23\frac{1}{2}$	$1\frac{1}{3}$ tops, $2\frac{1}{4}$ leaves.	*Experiment No. 89.*—Sugarcane, *pundia*, on medium black soil, *moryal*, manured with 17 cart-loads per acre of ordinary manure and with sheep folding (333 per acre) for a month. Field irrigated from a *dharan* fed from a channel. Season and tillage good. Seed rate high compared with the formulæ (1,500 canes per acre); and the outturn 3 times the yield recorded for a 12-anna crop. Fresh tops fed to the cattle working the mill and stripped leaves burnt as fuel in preparing the *gul*; therefore their value, estimated at Rs. 119, excluded from column 9.

Summary of Crop Experiment Reports,

O. S. = Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulæ.	Average per Acre.					
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of gross Produce.
						Principal Product	By-product.			
1	2	3	4	5	6	7	8	9	10	11
	BELGAUM.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	Mr. R. E. Enthoven, Assistant Collector.									
90	Parasgad (Rainápur)...	Great millet (Gidjol), 22nd November 1893.	16	1,120	14½	273	5 bundles kadbi, 45 chaff.	5 15 7	0 11 3 R. S.	11·76
91	Do. (Chulki) ...	Do. (do.) 4th December 1893.	16	1,120	10	609	10 bundles kadbi, 150 chaff.	11 9 0	1 4 10 R. S.	11·26
92	Do. (do.) ...	Do. (do.) 6th December 1893.	20	1,400	5¼	1,493	16 bundles kadbi, 320 chaff.	27 5 4	1 3 0 R. S.	4·34
	Mr. C. C. Boyd, Assistant Collector.									
93	Gokák (Gokák) ...	Do. (Jola), 1st December 1893.	14	940	4¼	398	2,220 kadbi, 90 chaff.	15 1 3	1 5 0 R. S.	8·70
94	Do. (do.) ...	Spiked millet (Shejji, Bájri), 1st December 1893.	12	400	2⅕	274	625 straw, 85 chaff.	7 14 3	1 7 8 R. S.	18·74
	Mr. N. G. Deshpánde, District Deputy Collector.									
95	Chikodi (Kabbur) ...	Do. (do.) 30th November 1893.	20	800	2	552	792	12 8 10	0 11 7 R. S.	5·76
96	Do. (Vijenagar) ...	Do. (do.) 28th do.	20	800	2	318	547	7 10 7	0 7 10 R. S.	6·39
97	Do. (do.) ...	Do. (do.) 27th do.	20	800	2	214	492	5 8 5	0 3 3 R. S.	3·36

Southern Division, 1893-94.

R. S. = Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	Prices of Produce per Rupee.		Remarks.
		Principal Product.	By-product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 8	70	57½	5⅓ bundles kadbi, 1⅔ chaff.	*Experiment No. 90.*—Kharif *jowári, gid jol,* with *tur* and *kulthi* subordinate to it; soil reddish black; 16 cart-loads of cowdung per acre applied. Same mixed crop every year. Rain late but favourable. Tillage not careful, field weedy. The subordinate pulses were not tested. Seed rate more than double the formulæ; outturn about 8 annas according to the same standard. The sample ser received, weighed in this office 66 tolas only.
0 8	80½	66	5⅓ bundles kadbi, 2⅔ chaff.	*Experiment No. 91.*—*Jowári* with *kulthi* subordinate to it. Principal crop only tested. Field has black soil. No manure given. Seed sown late. Season however favourable. Crop 12 annas according to the formulæ. The sample received, weighed 3 tolas short of the recorded weight.
0 15	82	63	5⅓ bundles kadbi, 4⅔ chaff.	*Experiment No. 92.*—*Jowári* with a variety of subordinate crops; a black soil field heavily dressed with 60 carts of cowdung per acre. Seed sown late but season favourable. The subordinate pulses not tested. The sample found 4 tolas short of the recorded weight. Crop full maximum according to the formulæ.
0 8	82⅛	42½	3½ kadbi, 10⅔ chaff.	*Experiment No. 93.*—Kharif *jowári* on poor red *masári* land sparingly manured with 2½ loads per acre of cattle dung and municipal refuse. Rotation undefined. The same crop with or without *tur* pulse grown during the last three years. Early rain scant; late rain abundant. Outturn slightly above 9 annas of the formulæ.
0 8	85½	43⅘	3⅔ straw, 9⅔ chaff.	*Experiment No. 94.*—*Bájri* on similar soil manured with 7½ carts of the above manure. Rotation undefined:—*jowári* with pulses for three years followed by *bájri* in the last two; sometimes *navani* (Italian millet) grown if rain favourable. Season same as above. Seed rate under-estimated; outturn 10 annas according to the formulæ. Incidence high, due to poor return.
0 20	86¾	51 1/5	1⅔	*Experiment No. 95.*—*Bájri* with *kulthi* subordinate to it. The mixed seed occupied every fourth row. Soil mixed black, red and calcareous. Rotation undefined; *bájri* either grown alone, or with a pulse or with *jowári*. Season not favourable, sowing rain late. Long break caused crop to wither. Heavy late rain brought *bájri* to maturity but caused failure of the subordinate pulse. Tillage inferior; field weedy. Yield, exclusive of the subordinate pulse, 14 annas according to the formulæ. By-product valued very high in all the tests (Nos. 95—99).
1 0	85	50⅛	Do.	*Experiment No. 96.*—Same crop on *mardi* land, *i.e.*, having a thin layer of black soil overlying *murum*. Field fairly manured by folding with sheep. The field grows *bájri* almost every year. Season, &c., as above. Tillage good. Outturn 11 annas according to the formulæ. The sample of grain received weighed 6 tolas short in this office.
1 0	Do.	Do.	1⅔	*Experiment No. 97.*—Same crop on reddish *mardi* soil. The same crop without any manure grown for the last five years. Tillage, &c., as above. Crop 9 annas according to the formulæ. The sample weighed 3 tolas short.

Summary of Crop Experiment Reports,

O. S. = Original Survey;

No.	District, Táluka, Village and Experimentor.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulæ.	Average per Acre.					
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of assessment on the Value of gross Produce.
						Principal Product.	By-product.			
1	2	3	4	5	6	7	8	9	10	11
	BELGAUM—*contd.*		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent
	Mr. N. G. Deshpánde, District Deputy Collector—contd.									
98	Chikodi (Jagnur) ...	Spiked millet (Shejji, Bájri), 1st December 1893.	20	800	2	218	475	5 10 3	0 3 9 R. S.	4·15
99	Do. (Bágevádi) ...	Do. 29th November 1893.	20	800	2	94	182	2 8 3	0 10 10 R. S.	26·91
	BIJÁPUR.									
	Mr. S. L. Batchelor, Assistant Collector.									
100	Bádámi (Adgal) ...	Great millet (KenjolaKharifJowári), 17th November 1893.	17	1,020	8	1,250	3,072	25 8 3	0 7 1 R. S.	1·73
101	Do, (do.) ...	Do. (do.)...	16	960	7	1,252	3,060	25 4 5	0 7 9 R. S.	1·91.
102	Do. (Yargop) ...	Do. (do.) 18th November 1893.	16	960	6½	1,177	3,210	24 7 10	0 13 10 R. S.	3·53
	Mr. A. W. G. Chuckerbutty, Assistant Collector.									
103	Bágevádi (Mangoli) ...	Spiked millet (Shejji), 17th November 1893.	11	310	3	422	687	9 3 11	0 6 6 R. S.	4·39
	Mr. R. C. Artál, District Deputy Collector.									
104	Bijápur (Bijápur) ...	Do. (do.), 1st November 1893.	16	640	4⅔	455	1,269	11 1 6	0 6 2 R. S.	3·47
105	Do. (Katkinhalli.)	Great millet (Bile Jola orlate Jowári), 20th February 1894.	16	960	6⅓	1,124	2,407	32 3 5	0 9 11 R. S.	1·92

Southern Division, 1893-94—continued.

R. S. = Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	Prices of Produce per Rupee.		Remarks.
		Principal Product.	By-product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
1 0	85	50⅛	1 3/14	*Experiment No. 98.*—Same crop on similar but more stony soil fairly manured by sheep-folding. Season, &c., as above. Crop 9 annas only.
1 0	Do.	Do.	13/14	*Experiment No. 99.*—Same crop on the highest and worst portion of a sloping field. Test area had a thin layer of red soil. Rotation:—*Jowári* and *bájri* mixed almost every year and sometimes *bájri* alone. Crop less than 6 annas of the formulæ. The grain sample weighed 78 tolas only. Incidence high, owing to the poorest portion of the field being experimented upon.
0 10	77	59¼	6 3/14	*Experiment No. 100.*—Kharif *jowári, kenjola,* on red *masári* soil manured with 15 cart-loads of cowdung per acre and growing *jowári* and *bájri* in alternate years. Season favourable and tillage good. Low value of the by-product in this and the following two tests attributed to good harvest throughout the district.
0 8	78	60	Do.	*Experiment No. 101.*—Same crop on similar land manured with 12 cart-loads per acre of cow and goat dung. Rotation same as above. Season favourable; tillage fair. Samples of grain for this and the following tests not forwarded to this office as required by standing orders.
0 8	77	59¼	Do.	*Experiment No. 102.*—Same crop on similar but more highly assessed land manured with 20 carts ordinary manure per acre in the previous year. The field grows *jowári* every year. Season, &c., as above.
0 10⅔	149⅓	49⅓	7⅐	*Experiment No. 103.*—*Bájri* on black soil with subordinate crops of *navani* and *tur* in separate rows. Field manured three years ago with 34 carts of ordinary manure per acre. *Jowári* and *bájri* with subordinate pulses or oilseeds grown indiscriminately. Season fair; seeds or seedlings partially destroyed by rats which did considerable damage in the district early in the monsoon. Tillage good. Sample forwarded to this office weighed 146 tolas only.
0 10⅓	146	44⅞	12	*Experiment No. 104.*—*Bájri* with a subordinate sprinkling of *tur, ambádi, til* and *rála* on sandy loam soil locally called *halbhumi.* The field was Government waste before 1891-92. The crop tested was the second arable crop taken since. Land manured with 9½ cart-loads of farm-yard manure per acre. Rainfall timely and sufficient for the test crop. A wild grass locally called *vanti kasa* choked up all the subordinate crops. Outturn 13 annas according to the formulæ.
	134⅞	50¼	2⅜	*Experiment No. 105.*—Late *jowári, bile jola,* on reddish black *masári* soil. The field never manured. Rotation undefined. The cropping during the three previous years was:—(1) *Jowári,* (2) wheat and gram and (3) *jowári.* Rainfall timely and sufficient; cultivation fair. Outturn 18 annas according to the formulæ. Sample of grain received in this office weighed 5½ tolas short of the weight reported.

Summary of Crop Experiment Reports,

O. S. = Original Survey ;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulæ.	Average per Acre.					
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of gross Produce.
						Principal Product.	By-product.			
1	2	3	4	5	6	7	8	9	10	11
	BIJA'PUR—*continued.*		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	Mr. R. C. Artál, District Deputy Collector—contd.									
106	Bijápur (Bijápur) ...	Great millet (Bile Jola or late Jowári), 27th February 1894.	14	805	6⅓	784	2,110	23 14 3	0 11 1 R. S.	2·89
	Mr. J. L. Lushington, Divisional Inspector, L. R. and Agriculture, S. D.									
107	Muddebihál (Muddebihál).	Niger-seed (Gurellu), 1st December 1893.	11	195	1¾	195½ seed.	...	7 13 0	0 3 2 R. S.	2·53
	DHA'RWA'R.									
	Mr. A. R. Bonus, Assistant Collector.									
108	Dhárwár (Kadenhatti).	Eleusine coracana (Rági), 23rd November 1893.	8	300	10⅕	400	1,405	8 7 0	1 0 4 R. S.	12·09
109	Do. (Kelgeri) ...	Do. (do.) 11th December 1893.	11	580	10⅕	721	2,090	15 7 6	0 6 4 R. S.	2·62
110	Bankápur (Shiggaon) .	Pigeon pea (Togri), 15th February 1894.	13	475	21	310	330 husk, 692 stalks.	5 14 2	2 10 9 R. S.	45·39
	Mr. R. E. Kánga, District Deputy Collector.									
111	Gadag (Hulkoti) ...	Eleusine coracana (Rági), 18th December 1893.	12	400	8	1,253	2,228	21 8 4	0 12 2 R. S.	3·53
112	Do. (Dundur) ...	Do. 19th December 1893.	8	160	6½	421	1,108	7 10 11	0 3 5 R. S.	2·77
113	Do. (Gadag) ...	Linseed (Agashi), 8th March 1894.	8	100	1¾	76 seed.	...	3 9 7	1 3 3 R. S.	

Southern Division, 1893-94—continued.

R. S. = Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	Prices of Produce per Rupee.		Remarks.
		Principal Product.	By-product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 10	139⅝	50¼	2⅜	*Experiment No. 106.*—Same crop on deep black soil locally called *yeri*. Field never manured. Rotation:—(1) *Jowári*, (2) do. and (3) cotton. Season, &c., as above.
0 8	61	25	...	*Experiment No. 107.*—Niger-seed, *gurellu*, on the better portion of a field having reddish brown soil called *kyásari*, growing usually *jowári* and *bájri* mixed with pulses, &c. No manure ever applied. Season favourable for niger which was grown this year as a sole crop for the first time. Tillage good. Seed rate low.
0 8	135½	55½	10	*Experiment No. 108.*—*Rági* on red soil, near the top of an undulation, *mardi masári*. *Jowári* grown during the previous two years. No manure applied. Season good; tillage indifferent. Crop 10 annas according to the formulæ.
0 8	Do.	Do.	7½	*Experiment No. 109.*—Same crop on upland level soil also red. 2⅜ carts of cow-dung per acre applied. Rági and jowári grown alternately. Tillage and season both good. Crop 12 annas of the formulæ.
1 0	173	57	21⅞	*Experiment No. 110.*—*Tur*, a subordinate crop, occupying every eighth row. Field has blackish grey *karal* land. *Jowári* with *tur* and green gram subordinate to it grown for the past three years. No manure applied during that period. The figures reported show the actual acre outturn. The *tur* spread out and nearly covered the ground after the other crops were removed. Sample weighed in this office 170 tolas only.
0 11 11/16	157	76½	3⅝	*Experiment No. 111.*—*Rági* with a mixture of *tur* and green gram in every sixth row on red, *kemp masári*, land growing without manure *jowári* and *rági* in alternate years each with a mixture of pulses. The field though not manured has the advantage of being close to the village and is naturally profited thereby. Rain somewhat deficient, but season on the whole good. Tillage also good. Subordinate crops not tested, yet the outturn 1½ times the maximum of the formulæ.
0 12	152	74	5	*Experiment No. 112.*—Same crop on similar but poorer unmanured soil. Rotation:—(1) *Sáva*, (2) *navani* and (3) *rági*, each with an admixture of *tur*. Season, &c., as above. Outturn 12 annas of the formulæ.
2 0	132	21⅛	...	*Experiment No. 113.*—Linseed a subordinate crop sown mixed with *jowári* in every sixth row on ordinary black soil growing (1) cotton, (2) wheat and (3) *jowári* with mixtures. Season and tillage good. The seed rate is the actual quantity sown with *jowári* over an acre in every sixth row only and the yield is the actual outturn of an acre. The sample forwarded gave an excess weight of 2½ tolas in this office.

Summary of Crop Experiment Reports,

O. S.=Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulæ.	Average per Acre.					
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of gross Produce.
						Principal Product	By-product.			
1	2	3	4	5	6	7	8	9	10	11
	KOLA'BA.		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	Mr. J. H. DuBoulay, Assistant Collector.									
114	Pen (Borgaon) ...	Eleusine coracana (Halvi early Rági), 23rd October 1893.	11	390	5⅓	1,478	...	35 14 1	0 3 6 O. S.	0·61
115	Do. (A'mbeghar) ...	Do. (Garvi late Rági), 1st November 1893.	12	1,000	6½	1,115	...	27 0 11	0 2 6 O. S.	0·58
116	Do. (do.) ...	Panicum miliare (Bhuri or late Vari), 24th October 1893.	16	800	2⅘	812	...	16 15 0	0 2 6 O. S.	0·91
117	Karjat (Karjat) ...	Gram, 7th February 1894.	13	265	91	759	...	23 13 6	5 2 7 R. S.	21·58
	Mr. K. N. Bhángáonkar., District Deputy Collector.									
118	Alibág (Kude) ...	Eleusine coracana (Nagli), 18th October 1893.	18	1,800	...	1,973	80 head-loads.	53 8 8	0 2 6 O. S.	0·29
119	Roha (Chávre) ...	Panicum miliare (Vari), 23rd October 1893.	17	850	...	527	2,164	12 6 0	0 2 6 O. S.	1·26
120	Mángaon (Rile) ...	Gram, 28th February 1894.	15	300	101	353	...	10 2 11	0 12 2 O S.	7·46
	RATNA'GIRI.									
	Mr. G. D. Pánse, Assistant Collector.									
121	Devgad (Mutát) ...	Salt rice (Khára-dodka), 16th November 1893.	12	750	58	909 in husk.	2,986	23 1 10	1 0 9 O. S.	

Southern Division, 1893-94—continued.

R. S.=Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	Prices of Produce per Rupee.		Remarks.
		Prinicipal Product.	By-product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 8	63	$41\frac{1}{5}$	...	*Experiment No. 114.*—*Halvi* or early *nágli* on reddish *mál* land growing *nágli* and *vari* for two years after four years' fallow. Seed-bed ($3\frac{1}{2}$ gunthas for an acre of plantation) liberally rábed with cowdung, coarse and fine grass, rubbish and fine earth. Season on the whole fair, though rainfall deficient both at the beginning and at end of the monsoon. Tillage fair. Crop more than maximum according to the formulæ though estimated at 11 annas only.
0 8	Do.	Do.	...	*Experiment No. 115.*—*Garvi* or late *nágli* on upland *varkas dongri* land growing the same crops under similar conditions. The seed-bed, 2 gunthas for an acre of transplantation, rábed with brushwood, coarse and fine grass, rubbish and earth. Season and tillage as above.
0 8	66	48	...	*Experiment No. 116.*—*Bhuri* or white *vari* on another part of the above field. Five gunthas of seed-bed, sufficient for an acre of transplantation, rábed with 10 carts brushwood and 7 each of coarse and fine grass and rubbish and 5 carts of earth. Season, &c., as above.
0 8	74	$32\frac{1}{4}$	...	*Experiment No. 117.*—Gram, a second crop, on ordinary *chickan* rice land growing rice every year followed occasionally by a pulse only on a portion of the field. Season good. Seed rate very high. The outturn half as much again as the maximum crop of the formulæ. Incidence calculated on the 2nd crop alone.
0 8	$64\frac{3}{8}$	$39\frac{2}{3}$	21 head-loads.	*Experiment No. 118.*—*Nágli* after a fallow of three or four years followed by *vari* in the 2nd year. Six gunthas of seed-bed rábed with solid droppings of 22 heads of cattle tied, for two months, on the area of transplantation; 40 head-loads of grass and 7 carts of household refuse also used as ráb material on seed-bed. Season favourable; and tillage good. About $6\frac{1}{2}$ lbs. seed sown on a seed-bed of 6 gunthas. Proportionate area of seed bed to acre of transplantation not reported, therefore acre seed rate unknown. Sample 3 tolas short of the reported weight.
0 8	$65\frac{1}{5}$	$50\frac{1}{7}$	$10\frac{1}{7}$	*Experiment No. 119.*—*Vari* on land similarly cropped and similarly assessed. Twelve gunthas of seed-bed were rábed with 10 carts of cowdung, 10 of coarse grass, four of fine grass and two of rice husk. Season favourable; and tillage good. The sample forwarded to this office fell short of the recorded weight by 7 tolas. $1\frac{1}{4}$ lbs. seed sown on 12 gunthas. Proportionate area of seed-bed to acre of transplantation not reported, therefore, acre seed rate unknown.
0 10	82	$34\frac{1}{3}$	...	*Experiment No. 120.*—Gram grown continuously on unmanured *malkhandi* land in which water is impounded in the monsoon to prevent growth of grass and to secure moisture for the pulse. Season fair. Reported seed rate apparently very high. Sample received in this office gave an excess of 6 tolas over the reported weight.
	$30\frac{1}{4}$	$43\frac{1}{2}$	$12\frac{1}{5}$	*Experiment No. 121.*—Salt *dodka* rice grown from sprouted seed on unmanured *khájan* land. Season good and tillage fair. Outturn 13 annas according to the formulæ.

Summary of Crop Experiment Reports,

O. S. = Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulæ.	Average per Acre.					
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of gross Produce.
						Principal Product	By-product.			
1	2	3	4	5	6	7	8	9	10	11
	RATNA'GIRI—*contd.*		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	Mr. G. D. Pánse, Assistant Collector —continued.									
122	Devgad (Giren) ...	Rice (Tavasál), 13th November 1893.	12	1,000	120	830 in husk	6,282	26 5 3	7 8 4 O. S.	28·56
123	Rájápur (Kodavli) ...	Paspalum scrobiculatum (Harik), 29th November 1893.	10	250	39	388	...	4 12 4	0 3 1 O. S.	4·04
	Mr. L. C. Crump, Assistant Collector.									
124	Dápoli (Harnai) ...	Rice (Patni), 4th November 1893.	16	2,000	72	1,772 in husk	4,160	53 13 4	9 3 8 O. S.	17·14
125	Do. (do.) ...	Do. (do.) ...	16	2,000	72	2,133 Do.	5,214	64 15 6	8 1 11 O. S.	12·49
126	Do. (Choli) ...	Paspalum scrobiculatum (Harik), 16th November 1893.	17	680	37	942	1,350	14 9 7	0 2 9 O. S.	1·17
127	Do. (do.) ...	Do. (do.) ...	17	680	37	458	800	7 4 1	0 2 0 O. S.	1·72
	Mr. S. S. Kamlápurkar, District Deputy Collector.									
128	Ratnágiri (Shirgaon) ...	Rice (Fine Vánksál), 2nd November 1893.	12	1,000	67	1,170 in husk	2,250	42 0 6	5 12 7 O. S.	13·76
129	Do. (Mirjole) ...	Do. (Coarse Vánksál), 3rd November 1893.	14	1,340	68	1,542 Do.	4,000	57 8 0	4 0 6 O. S.	7·01
130	Sangameshvar (Phansavne).	Eleusine coracana (Nágli, Mahán, Mahádi), 13th November 1893.	14	1,340	11½	1,275	1,050	34 3 10	1	

Southern Division, 1893-94—continued.

R. S. = Revision Survey.

Area of Test.	Equivalent in Tolas of local measure Ser.	Prices or Produce per Rupee.		Remarks.
		Principal Product.	By-product.	
12	13	14	15	16
A. g.	Tolas.	Lbs.	Cwts.	
0 4	30½	37½	13⅔	*Experiment No. 122.*—Continuous rice, *tavasál*, on kharif *malai* land manured with the ashes of 51 bundles of dry leaves and 31 head-loads of cowdung. Seed artificially germinated and then sown broadcast. Season good; and tillage fair. Seed rate more than double the formulæ. Outturn 10 annas according to the same standard.
0 6	33	81¼	...	*Experiment No. 123.*—*Harik* on *bharad varkas* land growing (1) *nágli*, (2) *vari*, (3) *harik* and (4) *til* after three years' fallow. Area of test below the prescribed minimum. Seed rate four times that of the formulæ and outturn 12 annas.
0 4	47	43⅓	2⅔	*Experiment No. 124.*—Continuous rice, *patni*, on unmanured kharif, *pánthal*, land. 10 gunthas of seed-bed, rábed with 30 head-loads of cowdung and 40 of grass, supplied seedlings for an acre of transplantation. Season and tillage both fair. Outturn 14 annas according to the formulæ.
0 4	Do.	Do.	3	*Experiment No. 125.*—Same crop on similar soil bearing a slightly lower assessment, but occupying a more favourable position, being at the foot of a hill from which it benefits by the annual wash. Other conditions as above.
0 8	48	69	12⅔	*Experiment No. 126.*—*Harik*, on fairly flat *bharad varkas* land. The field grows *nágli*, *vari*, *harik*, &c., in rotation, and when exhausted lies fallow for five years. The field rábed for the previous crop. Season favourable; and tillage good. Seed more than treble the formulæ rate and yield full maximum.
0 8	47	67½	15¼	*Experiment No. 127.*—Same crop on a steep stony field. The field, when exhausted after a short rotation of inferior millets, lies fallow for eight years. Other conditions same as above. Outturn 12 annas when compared to the formulæ standard.
0 4	40¾	33½	2⅔	*Experiment No. 128.*—Sprouted rice, fine *vánksál*, grown continuously on *kudyat* red kharif, slightly sloping land manured with 60 head-loads of refuse per acre before the rains and with an equal quantity of cowdung at sowing time. Hot weather irrigated rice grown annually on a portion of the field as a second crop. Season fair; but tillage not careful. By-product valued high.
0 4	41¾	34¼	Do.	*Experiment No. 129.*—Continuous rice, coarse *vánksál*, sown broadcast without pre-germination on low-lying, *bávool*, brown alluvial soil, which receives the wash from higher fields all round and which, for the crop, was rábed with 30 head-loads each of cowdung and leaves and 40 bundles of grass per acre burnt over the whole field in March. Season favourable; and cultivation good. Crop full average.
0 8	56½	40½	3⅔	*Experiment No. 130.*—*Nágli*, *mahán*, grown every year without any fallow on red sandy, *umbar pulanvat*, sloping soil situated on the bank of a *nála*; seed sown seed-bed, 6 gunthas for an acre of field, rábed in March with 25 load dried cowdung, 30 loads of tree loppings, 20 loads of grass and 5 of *hari* Season and tillage good.

Summary of Crop Experiment Reports,

O. S. = Original Survey;

No.	District, Táluka, Village and Experimenter.	Crop and Date of Experiment.	Local Estimate in Annas.	Yield according to Formulæ.	Average per Acre.					
					Seed.	Yield of		Total Value of Produce.	Assessment, excluding Local Funds.	Incidence of Assessment on the Value of gross Produce.
						Principal Product	By-product.			
1	2	3	4	5	6	7	8	9	10	11
	RATNA'GIRI—*contd.*		Annas.	Lbs.	Lbs.	Lbs.	Lbs.	Rs. a. p.	Rs. a. p.	Per cent.
	Mr. S. S. Kamlápurkar, District Deputy Collector —continued.									
131	Sangameshvar (Dhámni).	Eleusine coracana (Nágli, Mahán, Gunjavali), 14th November 1893.	12	1,000	9½	996	1,100	27 10 3	0 4 0 O. S.	0·90
	KA'NARA.									
	Mr. N. B. Divatia, Assistant Collector.									
132	Ankola (Sunksál) ...	Rice (Kempbhatta), 9th December 1893.	12	1,500	15½	2,745 in husk	6,353	74 1 7	2 12 3 O. S.	3·73
133	Do. (Belikeri) ...	Late rice (Vaingun Chitka), 3rd May 1894.	10 to 12	...	132	977 Do.	2,417	32 5 1	5 3 11 O. S.	16·23
	Mr. C. W. M. Hudson, Assistant Collector.									
134	Kárwár (Kone) ...	Rice (Kempu Pandya), 21st October 1893.	15	1,110	229	2,328 Do.	2,750	63 5 2	5 5 1 O. S.	8·39